THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXV. No. 622.] LONDON, APRIL 13, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
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These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
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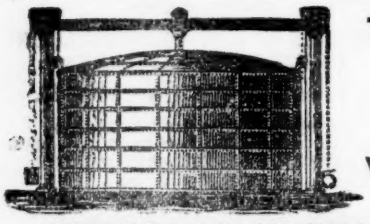

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Retorts, Retort-Fittings, Condensers, Scrubbers, Purifiers, Station-Meters, Governors, Rack and Screw Valves. Gas and Water Mains always in Stock.

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1862.

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CLASS II.

This Paint having been in general use over thirteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

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Beg respectfully to remind Gas Companies and Corporations that they continue to manufacture and supply every description of Apparatus connected with the

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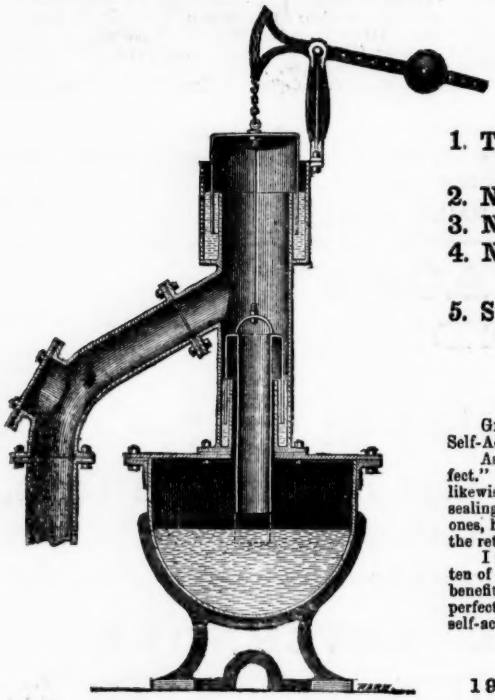
REFERENCES TO MORE THAN 500 WORKS ALREADY ERECTED.

PROSPECTUSES AND TESTIMONIALS ON APPLICATION.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

For terms of use and cost, apply to Mr. G. W. STEVENSON,

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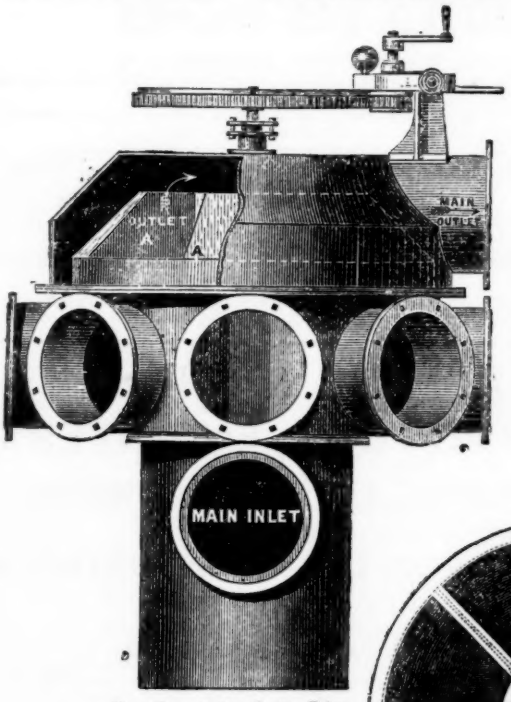
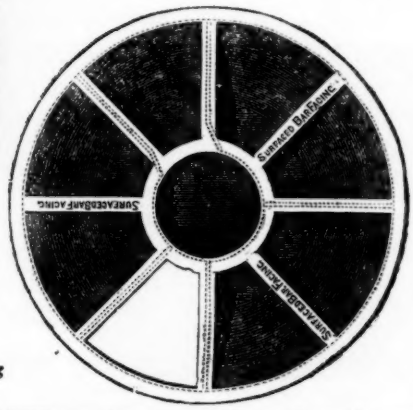
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.

Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.

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MANUFACTURE EVERY DESCRIPTION OF
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ALSO,
WROUGHT-IRON TUBES & FITTINGS.
SHORT STREET, LAMBETH, LONDON.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
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NEWCASTLE-ON-TYNE.

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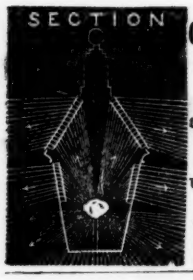

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Is now in use in
Moorgate Street,
Cheapside,
and Trafalgar Square,
and has been in
successful operation
upon Waterloo Bridge
since Oct. 7, 1871.
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GOVERNORS, GAUGES, INDICATORS, EXHAUST & PRESSURE REGISTERS,
GAS STATION-METERS,
With all the joints planed.
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WITH WROUGHT-IRON PINIONS,
List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO, SCREW WATER-VALVES WITH GUN-METAL FACES.
ALSO SOLE MAKERS OF
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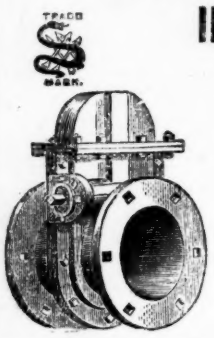

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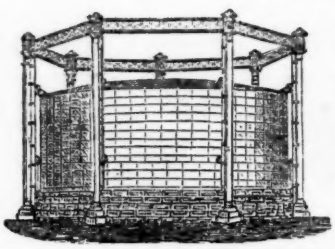
AND GENERAL IRONWORK.



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Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves**.
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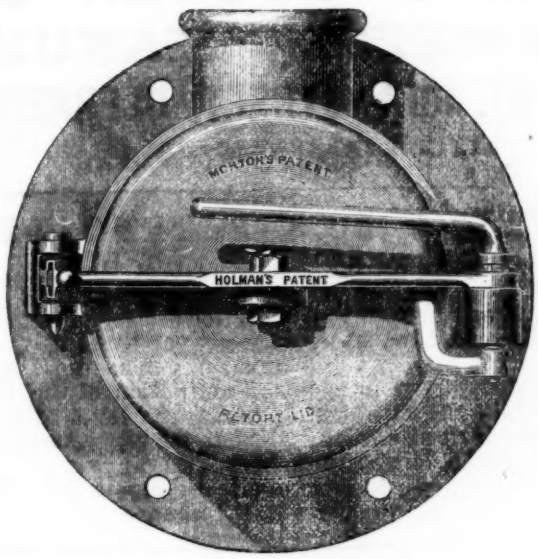

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Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested (rigid cast iron is now successfully employed), nearly 15,000 being in use at various Gas-Works in London and the Provinces, among which may be mentioned:—

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" Gaslight Co., Bow Common.
" Gaslight Co., Silvertown.
" Gaslight Co., Lupus Street.
" London Gaslight Co.
" Independent do.
" Phœnix do.
" South Metropolitan Gaslight Co.
" Commercial do.
" Imperial do.
" West Ham Gas Co.
" Gas-Works, Barnet.

The Gas-Works, Royal Arsenal, Woolwich.
" do. Lower Sydenham.
" do. Brentford.
" Consumers Gas Co., Woolwich.
" Alliance and Dublin Gas-Works.
" Edinburgh do.
" Manchester Corporation do.
" Salford do. do.
" Rochdale do. do.
" Liverpool Gas-Works.
" Birmingham do.
" Birkenhead do.
" Nottingham do.

The Newcastle-on-Tyne Gas-Works.
" Largan do.
" Carmarthen Gas-Works.
" Merthyr Tydfil do.
" Windsor do.
" Leeds do.
" St. Albans do.
" Over Darwen do.
" Rotherham do.
" Aylesbury do.
" Bournemouth do.
" Ystrad do.
" Cardiff do.
" Rochester do.

The Keighley Gas-Works.
" Aberdare do.
" Ballymena do.
" Richmond do.
" Stalybridge do.
" Longton do.
" Exeter do.
" Ross do.
" Falmouth do.
" Barrow-in-Furness do.
" Belfast do.
" Wakefield do.
And other Provincial and Foreign Gas-Works.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (Commonly called the Chartered Gas Company), Beckton, North Woolwich, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly,
(Signed) G. C. TREWBY.

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STEAM-ENGINES.

OVER 1200 SOLD SINCE THEIR INTRODUCTION IN DECEMBER, 1869.

In designing this Engine the utmost regard has been paid to simplicity of arrangement, strength of construction, and economy in cost. The working parts are considerably reduced in number, as compared with Horizontal Engines generally, rendering it far more durable and compact, the bed-plate, front cylinder cover, guides, and plummer-block for crank-shaft bearing being all cast in one piece, which in design and proportions is admitted by competent engineers to be perfect, and to afford a strength and rigidity that cannot possibly be attained in the best fitted engines of the ordinary horizontal type. The extraordinary stiffness of this Engine will permit of its being driven at a much greater maximum speed than engines generally, and with far less wear and tear. The cylinder with its valve-chest is bolted to the end of the bed. The cross-head slippers and connecting-rod ends are made adjustable, so that any wear can be readily taken up. The fly-wheel, cylinder-end, connecting-rod, and crank-plate, are all bright. All the parts are made to Whitworth's Gauges, and the material and workmanship are of the highest class throughout.

The Governor is of a very special description, and combines in the small space usually occupied by the ordinary steam stop-valve, a governor, throttle-valve, and stop-valve complete. It is exceedingly sensitive, simple, and compact.

These Engines are adopted in Gas-Works at Haggerston (Independent Gas Company), Nine Elms (London Gas Company), Falmouth, Harrow, Jersey, Plymouth, Richmond, Rochdale, Santiago (Chili), &c.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

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The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

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6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
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AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, APRIL 13, 1875.

Circular to Gas Companies.

THE second reading of the Regulations Bill has been postponed until to-day, and the rejection of the measure is to be proposed by Mr. Young, the Liberal member for Helston, in place of Colonel Beresford, the Conservative member for Southwark. There is, of course, a chance that Sir Charles Forster may be called upon to move that the order of the day be discharged, and the Bill withdrawn; but we do not calculate on this, and fully expect to see the Bill go before a committee. For, if the principle of a parliamentary guarantee of maximum dividends be admitted, the companies might be content to accede to the second reading, and leave the details of the regulations proper to be settled by the committee. We are not aware of the circumstances which dictated the postponement last Tuesday. There was not much on the paper of business, and the House had plenty of time to consider the matter, which is not likely to involve a long debate. A little delay, however, is of no consequence; the gas companies are fully prepared for the struggle, come when it may, but we do not like being kept in suspense.

Whether or not the Metropolitan Board have any doubts about their authority to spend the ratepayers money in preparing and promoting such measures as the two gas Bills that have been withdrawn, we hardly care to inquire, but we must say that it is a suspicious circumstance that the Board refuse to disclose where the authority is to be found. To our minds, there is not the smallest occasion for this reticence, and, if the authority exists, we altogether fail to see the inconvenience of Mr. Legg's question. If no authority exists, the fact is certain to be known. The question put by Mr. Legg to the solicitor of the Board, will most likely be put to Sir J. Hogg, in the House of Commons, in a few days, and then we may obtain a definite reply.

We notice that the Metropolitan Vestries and District Boards are anxious to be heard individually before the committee on the Regulations Bill, if one should be appointed. The time of a committee of the House of Commons is, however, too precious to be wasted, and the gentlemen who are wishful to distinguish themselves as witnesses may probably find that the committee will decline to listen to more than one or two of them. The mention of vestries reminds us to remark that, the chairman of the Phœnix Company made an excellent point, when he called attention to the fact that, during all the time of high-priced coal, his company have made no addition to the charge for public lamps. The fact is highly creditable to the company, and the forbearance should have been appreciated. But who ever heard of a grateful vestry?

The position of the Phœnix Company must be regarded as very satisfactory. We share the chairman's wish, that it may be possible ere long to reduce the price of gas to the former rate. But we have no hope that coal will return to the price of 1871. We have before said that we anticipate a permanent rise of at least 25 per cent. over the price in 1871; and, under those circumstances, unless some great change takes place in the market for residuals, the charge for gas must be correspondingly increased. At the present moment we see no prospect of any improvement in the value of residuals. Tar and ammonia at present fetch their full value, and coke, it is hardly necessary to say, will continue to command an uncertain price. As regards the works and plant of the company, the shareholders have every reason to be satisfied. The sale of 9145 feet of gas per ton of coal, in a district like that of the Phœnix Gas Company, reflects much credit on the management.

It is hardly worth mentioning, but it may as well be pointed out, that the profits of the South Metropolitan do not quite make up the amount required for dividend. The difference, it is true, is very small, only about £1100, which is taken from a balance, and not from the reserve-fund. The shareholders will be gratified to learn that further capital will soon be required, but if expended in the most judicious manner, as we know that it will be, this additional capital cannot possibly be immediately remunerative, and a result, which we regard as inevitable—an increase in the price of gas—sooner or later, must follow.

The report of the directors of the London Gaslight Company, to be presented to the half-yearly meeting to-morrow, is another highly satisfactory document. The profits of the half year enable the directors to pay maximum dividends, and to restore to the reserve-fund the amount taken to make up the last dividend, and, indeed, to make some addition to the fund; and this, notwithstanding that the company, like all others, have suffered considerably from the depreciated value of coke. If the working of the current half year should prove as satisfactory, the customers of the company may look for some reduction of price.

The committee on the Birmingham Gas Bills have been nominated, and will commence their sittings on Thursday next. The Corporation Purchase Bill, of course, stands first in order for consideration. The opposition to the Bill is somewhat narrowed, but it is still rather formidable. There is, first of all, a body of consumers in the borough who do not believe, any more than we do, that they will be benefited by the transfer. Then there are the several outlying Local Boards who are afraid of being taxed for the advantage of Birmingham. And then there are certain political opponents of the late mayor, who regard the scheme with aversion, simply because it has been promoted by Mr. Chamberlain. With the two former we may sympathize. The consumers, who are not likely to be benefited, but who, if the Bill should pass, may be rendered liable to additional taxation, may well urge that provisions should be inserted in the Act, to make the undertakings, when in the hands of the Corporation, self-supporting, and nothing more. It must be enacted, that gas consumers shall not be taxed for "improvements," and that ratepayers shall not be taxed to supply gas at less than cost price. If this be done, the outlying Local Boards may accept the supply of the Corporation with gratitude.

Gas agitation, which has never entirely ceased in Swansea, has broken out again with renewed violence. It is fanned by such statements as the following, which we copy from the leading local

journal:—"Many of the gas companies in London supply gas to "their customers at rates varying from 2s. to 2s. 6d. per 1000 "feet, at the same time paying their shareholders 10 per cent. "per annum on the whole of the capital invested." What can be said to people ignorant or mendacious enough to make a statement like this? The Swansea Gas Company may well treat them with the contempt they merit. If the Corporation wish for the undertaking, let them offer a fair price for it, and give Mr. Alderman Jenkins the opportunity of verifying his calculation, that gas may be sold in Swansea for 1s. 6d. per 1000 feet less than is now charged for it.

We have not yet been able to procure a copy of Sir W. C. Anstruther's Bill, but we gather the main provisions of the measure from a letter of the promoter to the Convention of Royal Burghs, who are now holding their annual sittings. The Bill is, first of all, to give local authorities in Scotland the power to purchase gas undertakings, with the consent of three-fifths of the shareholders. To such an enactment no objection could be made. Nor, indeed, is there any harm in what follows, if certain restrictions be imposed. The Bill is to give power to the authorities to erect gas-works for the supply of public and private lights in towns and populous places. We expect, in the Bill, to see added the words, "where no gas-works exist." In that case it may pass. A *populous* place is defined as any town, village, place, or locality (not being a burgh with magistrates and councillors) having a population of 500 inhabitants. In these cases the Parochial Board is made the local authority; and we must confess that we should like to see a Parochial Board erecting gas-works to supply a populous locality with 500 inhabitants. Necessarily, borrowing powers, and, no less essential, rating powers, are to be conferred; and certain provisions of the Gas-Works Clauses Act, 1847, are to be applied. We shall probably soon have the Bill, and learn all about this curious piece of amateur legislation. So far as we see at present, it will not injuriously affect existing companies.

The Sheffield United Gas Company scarcely made both ends meet in the past half year, but they have only to take the insignificant sum of £268 from the reserve-fund, in order to pay maximum dividends. The maximum price of gas in Sheffield is now only 3s. 1d. per 1000 feet, and we hope the long feud between the Corporation and the Company is now ended.

The Corporation of Halifax are about to lose the services of their able gas manager, Mr. Malam. They have advertised for a successor, and they offer, what we regard as the utterly inadequate remuneration of £250 a year. A gas company with an undertaking comparable to that of the Halifax Corporation, would know better than to offer such a sum, and it is more important to Corporations than to companies to secure the most efficient officers. Halifax will, no doubt, obtain a manager at the price, and, most probably, an efficient one; but, when we consider the onerous and incessant duties of the post, and the large amount of technical skill and scientific knowledge required for their satisfactory performance, we must say we are sorry for the man whom circumstances may compel to accept the stipend offered.

The Sale of Coal, &c. (No. 2) Bill has been printed, and in the construction of the Act the word "coal" is to include coal, slack, culm, cannel, cinders, and coke of every description. The odd feature in this new measure is, that it is not to apply to the metropolis or to any place within 25 miles of the General Post Office. Now, if such an enactment as is proposed be required at all, it is as much needed in the metropolis as elsewhere. As mentioned, however, the London gas companies and coke dealers are left free, but beyond the radius of the 25 miles, the following provisions are to apply. Coke sold in any quantity not exceeding 3 cwt. is to be weighed in the presence of the purchaser or his agent at the time it is delivered to the purchaser, or a penalty not exceeding £5 may be incurred. Quantities above 3 cwt., and not exceeding two tons, may be weighed before they are delivered to the purchaser, but if the seller or dealer deliver the same without having previously weighed it, he is liable to a fine of £5. By section 4 the penalty for short weight is to be £10, "provided that this section shall "not apply to any sale exceeding the weight of two tons." This limitation is curious. It, of course, suggests to provincial gas companies that they should refuse to sell coke in quantities, the weight of which did not exceed two tons, and then they may continue to sell by measure. The Bill, as we have mentioned, will only affect country undertakings, and we recommend these to commence at once active opposition to the Bill, for which, so far as we know, there is not the smallest occasion. If the promoters of the measure can show that any one is defrauded in the present mode of retailing coke, we shall be astonished. We have already shown what a temptation to fraud the sale of coke by weight would offer. The exclusion of the metropolis from the operation of the Bill we expect to hear quoted as another illustration of the power of the metropolitan gas companies, and we reply, by anticipation, that the companies have used their influence to a very good purpose. The Bill would have been a source of great grievance to a class of poor men who fulfil a very useful function in distributing coke in small quantities. The same class exist all over the country, and, on their behalf, we protest against this Bill becoming law, so far as it concerns coke. The buyers and sellers of culm and cannel are people who can well afford to look after their own interests. It must be understood that the objections we bring against the Bill apply simply to the sale of coke by weight.

The "Notification" (as the "Instructions" are now called) of the metropolitan gas referees, for the summer half year, ordains that the amount of "sulphur" in the gas supplied from the Chartered Company's works, at Beckton and Bow, and the Imperial works, at Bromley, shall not exceed 15 grains per 100 feet, and that from the other works under the supervision of the referees 20 grains. The last quarterly report of the chief gas examiner, an abstract of which we publish in another column, shows that, during the past quarter of maximum make, the *average* amount of "sulphur" in the gas supplied from the stations concerned has been considerably below the quantity now fixed. The maximum amount in the Beckton gas has but slightly exceeded the now prescribed quantity, and we may entertain hopes that with the diminished make of the summer, the requirements of the referees may be complied with. It is, however, impossible, and we believe always will be, to control the amount of sulphur with absolute certainty. The best that can possibly be done is to keep it within narrow limits, and this is now accomplished at the works mentioned. Under these circumstances, and when a low maximum has been fixed, the companies may fairly ask that no penalties should be incurred unless the average results of a week's testings show an excess of sulphur. Illuminating power is more under control, and for this reason, and others that might be adduced, we do not ask for any alteration of the law in that respect. When, however, such an uncertain operation as the purification of gas from "sulphur" is concerned, some latitude may be righteously demanded, and this would be granted if the average results of the week could alone furnish grounds for prosecution. Such a proposal, our readers know, has already been made, but as we become fixed to lower and lower maximums, the concession would be nothing more than common justice. If the Regulations Bill should ever get into committee, this point should be strongly urged by the companies, all of whom are interested in the question. The condition of the purifying material, and its capacity for removing "sulphur," varies from hour to hour, under circumstances not fully understood, and beyond control. It is, therefore, manifestly unjust to make a small excess within the short period of 24 hours the basis of a prosecution.

In connexion with this, we may call attention to Dr. Letheby's table of the illuminating power of the gas supplied. There has been no failing in this respect at any one station. The Imperial Company, we notice, take the lead in liberality, the average power of the gas from the Haggerston works being three candles above the statutory requirement. Dr. Whitmore, we notice, reports the gas of the Chartered Company below 16 candles on six occasions during the month of March. This does not agree with the return of the examiners of the Metropolitan Board. It must, however, be remembered that several miles of mains intervene between the testing-stations of the Board at Beckton and Mile End, and that of Dr. Whitmore at Marylebone, whereabouts in the parish we do not know. Taking, however, the nearest point in the parish, the loss of half a candle in the distance would not be at all surprising.

Water and Sanitary Notes.

We notice with satisfaction that the Liernur system of town drainage has been well described and fairly discussed at a meeting of the Society of Arts. Our columns are just now too crowded to allow of the insertion of Mr. Scott's paper, and, moreover, the notices of the system we have already given render the publication unnecessary. The first question to be asked in relation to the matter is—Is the process a success from a sanitary point of view? which must be regarded as of the greatest importance. The system, it seems, is in use in parts of Amsterdam and of Leyden, inhabited by all classes of people, and has been applied to barracks at Prague and other places, and sanitary reports relating to these localities express the most complete satisfaction. It may be, as one speaker urged, that sufficient time has not elapsed since the adoption of the system, for a sound opinion of its sanitary value to be formed. We are told, however, by Government officials, who may, it is presumable, be relied on, that typhoid and diphtheria, once prevalent in the districts now sewered by the system in Amsterdam and Leyden, have completely disappeared from the localities. As

regards cost, the information given was not so complete as could have been desired. The expense of the installation of the system was put by one speaker as £4 per head of population. Now, seeing that all that is realized in Holland by the sale of the material collected is only from 2s. 6d. to 3s. per head per annum, it follows that the system cannot possibly be remunerative, and we do not believe that if the manufacture of *poudrette* were combined, any better result would be obtained. The tub system, as at Rochdale, is evidently much cheaper, and its adoption is said to have been attended with equally good sanitary results. The aversion of English people, however, to open dealing with fœcal matters is so great, that the Liernur system is certain to commend itself to many, for the reason that, as regards private houses, everything is out of sight. The Corporation of London have appointed a committee to report upon the subject, and we shall soon hear more about it. In the meantime, it need only be said that, granting, as we fear we must, that the removal of excreta from our dwellings must be more or less costly, and attended with more or less unpleasantness, that system must be regarded as the best, which involves the least expense, and is attended with the least nuisance and danger to health.

The sewage arbitrations of the Corporation of Blackburn have, it would appear, involved the Corporation to the amount of £200,000, and perhaps more. And when this and much additional cost has been incurred, the town is tolerably certain to have to put up with a large annual loss on their sewage farm.

The select vestry of Richmond (Surrey) once entertained the idea of indulging in the luxury of a sewage farm; but they have abandoned it, we think, with some reluctance, on Mr. Hawksley reporting that they would require at least 400 acres, the cost of which would probably amount to £150,000. Mr. Hawksley's alternative plan is the treatment of the sewage with lime and sulphate of alumina, which, if properly carried out, will meet all the requirements of the Conservators of the Thames. The immediate outlay necessary is estimated at £10,000, and the working expenses are only calculated at £1000 a year. Something will, no doubt, be got for the material produced, but, probably, not enough to pay the expenses. The conclusion of Mr. Hawksley's report deserves the most serious consideration. He remarks that

> The rapid accumulation of people in the valley of the Thames above London plainly indicates that the period is not very remote when it will be necessary to construct intercepting channels to collect and convey the sewage, from at least as high up the river as Teddington to at least as low down as Erith Reach or Rainham Creek, so that in his opinion an expenditure on works such as those which have been in this or any other report indicated, for the exclusive purification of the sewage of Richmond, ought to be looked upon as more than a temporary, though unavoidable, expedient.

We are sorry to see that the negotiations of the Corporation of Newcastle and the water company, for the transfer of the works, have resulted in failure. The company asked for annuities equal to maximum dividends—that is, 6½ per cent. on the original stock, and 5 per cent. on the remainder. The Corporation offered on the original capital 5½ per cent. for the first two years, 5¾ per cent. for the next three years, and 6 per cent. afterwards, the stock to be redeemable within three years, at the present market value = £107 for every £100. These terms the company, of course, declined, and, the Corporation having made no advance, the company will now at once proceed with the works, which have remained in abeyance pending the negotiations. The Corporation seem to have been encouraged in their notions of the value of improvable property, by the terms of Colonel Beresford's little Bill for the purchase of the metropolitan companies—a Bill they will presently see either promptly withdrawn or ignominiously rejected.

We fancy we see growing up, among local authorities, a determined spirit of resistance to the assumptions of the Local Government Board, and if this should go on, one of two things must happen in the course of a few years. Either the central authority must abandon some of their pretensions, or they must go a step farther in centralization, and dictate directly and positively what the local authorities shall do. The Poor Law Department of the Local Government Board offers a precedent for this latter step. We need hardly allude to particular instances, but Upper Sedgely and Honiton just now afford illustrations of the direct conflict of the local with the central authority. In the latter case, the Town Council unanimously decided to ignore the communications of the Local Government Board; and in the former, the members of the Local Board contented themselves with abusing a medical inspector of the Central Board, and deferred the consideration of a proposal to reform their body, with a view to their dealing with nuisances.

The Corporation of Dublin, like their city, are always in a mess, and now they have been "committed" for not cleansing the streets. What will come of it, we do not know; but the Corporation have so often committed themselves, that no one will be surprised at their being "committed" by a magistrate.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

LIX.

Gasholders.

Thirty-five years ago, the period when Clegg's "Treatise on Coal Gas" was first published, it appears that the only materials employed for uniting brick and stone together, in the construction of holder-tanks, were Roman cement, mortar, and hydraulic lime. The first, as experience has proved, possesses defects to which reference has been made, rendering it by no means a desirable material for the purpose. The second, in addition to being porous, is also soluble in water; and the quality of the third is often so doubtful as to create considerable distrust in its adoption, for all ground limes are not hydraulic; so that the last is frequently more deceptive than the others.

Although Portland cement was invented or discovered, we believe, at the commencement of this century, it was not until 1851, when its remarkable strength was displayed at the Great International Exhibition, that particular attention was directed to it. Since that period its application for hydraulic work has been of the most extensive nature, and each year it has become more and more appreciated, on account of the facility with which it is worked, its remarkable tensile strength and impermeability, the length of time it may be stored in barrels without material deterioration, and its moderate cost, which are all strong recommendations for its employment. It possesses, moreover, still another great advantage, for, instead of decaying with time, it actually becomes harder after the lapse of many years, until it assumes the nature of the toughest rock. We can refer to a few instances in London and other places, where the pavement has been set in Portland cement, and where the stones being worn into recesses by the incessant traffic, the cement in the adjacent joints projects in polished ridges; clearly establishing the great degree of hardness this material acquires after the lapse of many years.

Possessing, as we thus do, cement of such vast superiority to anything employed in the construction of the earliest gasholder-tanks, it would be by no means creditable to engineers if they continued the use of puddle, as adopted by our forefathers, although it may be remarked that this material was retained for years after the excellence of Portland cement was established. This state of things has, however, been gradually changed, although each progressive step has been slowly taken, Portland cement being first employed for the foundations, and afterwards for the joints and rendering of tanks. This was followed by the introduction of the "composite" tank, its name being derived from the fact that it was composed of a thin brick wall, or lining, forming the interior of the tank, and backed with concrete to the desired thickness to ensure strength. For this system we are indebted to Mr. George Livesey, who commenced a tank of the kind in 1871, which was finished in the autumn of the following year. This method of construction presents many advantages in an economical point of view, particularly in localities where gravel abounds, in which case a saving of nearly two-thirds of the entire cost of the building material will be effected, whilst its strength is considerably greater than any stone or brick tank, equal thicknesses of material being assumed. But more recently Mr. Livesey, encouraged by his former success, entertained the bold idea of constructing a tank in concrete alone, and a vessel of this kind, 184 feet in diameter, and 47 feet deep, is now in the course of completion by him. In the whole of this stupendous work there is not a single brick, nor a single block of stone, nor a cubic foot of puddle. We have had the opportunity of inspecting this tank, and have seen with much pleasure the care displayed in its structure, and, being cognizant of the success which has attended another similar undertaking, to which reference will be hereafter made, we have no hesitation whatever in predicting a like result for the tank now in course of erection at the South Metropolitan Gas-Works, on the several points of economy, durability, strength, and soundness. Should these anticipations be realized, a great progressive step in this direction will have been taken.

For the purpose of comparing the past with the present, we may state that in Clegg's first edition the general instructions are, that any tank constructed otherwise than in the solid rock, should be secured by puddle over its whole area, and against the outer part of the wall forming it. Probably this was a wise precaution in those days, with the imperfect knowledge and means at command, but it is now no longer necessary. In his estimates, the author referred to, gives the cost for puddle at 1s. 6d. per cubic yard, and this is repeated so often that it cannot arise from an error; but as this price would hardly pay for excavation, working, and treading down, we conclude that, under such conditions, the clay for the purpose must have been obtained in the excavation. But if this were really the case, the puddle at the lower part, at least, could be dispensed with, and, following the example given at the St. Pancras station of the Imperial Gas Company, the centre might have been left as excavated. The use of puddle entailed other considerations, for, in order to level and make the footings for the wall, a circle of Yorkshire flagging was laid at considerable expense. The ground was also excavated level throughout the whole of the area, thus increasing the expenses of labour and cartage, and diminishing at the same time the strength of the centre of the tank. Clegg further recommended grouting every fourth course, which certainly is wrong; the only way to build a tank properly is to embed each brick in the cement, and fill up the joints at the same operation, when, of course, grouting will be unnecessary. Moreover, if grouting be employed, the workmen

will become less careful, and leave interstices to be filled up by that process; this, however, is not effected, and the natural result is that the tank loses water.

Beyond this, Clegg recommended large blocks of cut stone for the purpose of securing the holding-down bolts, and other small stone blocks as rest-stones, for supporting the holder when down, and sometimes stone coping for the top of the tank. Modern practice, at least in small tanks, is to construct the tank entirely of brick or stone, whichever material may be considered most eligible. If the former, the piers are continued to the top in brick, and the holding-down bolts are built therein, the top being terminated with bricks on edge, leaving, if desirable, a set off as cornice. The rest-blocks are simply bricks placed in their position with cement, all of which answer the purpose of stone, are considerably cheaper, and are readily procured.

The preceding and other similar instructions are to be found in Clegg's work, which, if adopted at the present time, would in some cases give rise to considerable expense and unnecessary trouble. It is hoped, however, that these observations will not be regarded in any invidious sense, for few persons have more respect for the memory of the Cleggs than we have, both on account of their great abilities and their personal worth. But we have made rapid progress since their time, in all the various departments of gas engineering, and our object in referring to the errors of the past is to indicate the proper course for the future.

Another important question is the position of gas companies at the present day, seeing the construction of some of these vessels costs *no less* a sum than £20,000. In the case of small companies, possessing a limited capital, the most economical means of construction are of the utmost importance, and it is desirable that all the facilities at disposal should be adopted, so as to avoid any unnecessary expenditure, without risking either the solidity, durability, or soundness of the vessels under consideration. This has been the aim of some of our eminent engineers during the last few years, in which they have succeeded to admiration; and Mr. Livesey's present undertaking will undoubtedly lead to other still more economical and more perfect constructions.

We have maintained throughout that puddle for tanks is unnecessary—that they can be built without the aid of this costly material—which averages 7s. per cubic yard when placed, instead of 1s. 6d., as stated by Clegg. Even where plastic clay can be obtained at a moderate cost, it is doubtful whether it is not better to construct the tank itself of such solidity as to retain the water, rather than to rely on a backing of puddle, which may crack or fall away from its position, for, if once a leakage occurs, the ground at the back may be washed away, and the worst consequences ensue. These mishaps are not likely to arise with a soundly built tank, for, once well built and sound, it will remain so, although, when first filled, the pores of the bricks may absorb a portion of water, and show an apparent leakage. These pores once partially or entirely filled, brick tanks are as sound as can be desired.

In the specifications for the construction of tanks which we proceed to give, it will be found that we generally refer to those built without the aid of puddle; but as many persons will differ from us on the main question, some few examples of the other kind will be introduced. By the kindness of some of the most eminent engineers of the day, we shall be enabled further to give descriptions and drawings of the largest tanks and gasholders in existence, which, no doubt, will be of much interest to many of our readers; at the same time, we shall not neglect the requirements of the smallest works, but give due attention to such details as will interest, and, we hope, profit those who are connected with them.

(*To be continued.*)

Complimentary Dinner to Employers.—On the 30th ult., the *employés* at Hope Iron-Works, Stockton-on-Tees, entertained their employers, Messrs. Ashmore and While, to a complimentary dinner in the borough hall. The spacious building was well filled with the workmen, their wives and sweethearts, who sat down to an excellent dinner, and all seemed heartily to enjoy themselves. After the removal of the cloth, Mr. R. Phillips, the general manager of the firm, was called to the chair, Mr. Shires acting as vice-chairman; and the loyal and patriotic toasts having been duly honoured by the company, Mr. Phillips proposed the toast of the evening—"Success to the firm of Messrs. Ashmore and While," and, in doing so, remarked that all present were aware that the purpose of their present meeting was to do honour to their employers, and show them how thoroughly the workmen appreciated their uniform kindness to them. He wished the firm the highest degree of prosperity and success, and earnestly hoped that they would continue to increase as they had done in years past. Four years ago they had established Hope Iron-Works with a staff of only five men, and now they were principals employing no fewer than 250 men in the manufacture of gasholders, boilers, bridges, &c. This was truly rapid development, even for the Cleveland district. As employers he might say that they were unsurpassed in the vicinity for the real interest they displayed in the welfare and comfort of their workmen. The vice-chairman followed by expressing the sincere pleasure it afforded him to be present, and wished every success to the "Firm." The toast was received by the company with great heartiness, and followed by rounds of cheers. Mr. Ashmore responded in suitable terms, and expressed his keen appreciation of the kind manner in which those present had invited Mr. While and himself that evening, and assured them of the pride he felt in being present. He also desired to impress upon the men the importance of all working together for their mutual advantage. Mr. While, in expressing the pleasure he felt in responding to the toast, remarked that it was much enhanced by the knowledge that those present had taken an active part in securing the success that had heretofore attended them, and he did not doubt of their future success if each did his duty as hitherto. Other toasts then followed, and amongst them those of "The Ladies," proposed by Mr. R. Linkler, and responded to by Mr. Fawell; "The Visitors," proposed by the chairman, and responded to by Messrs. Tirnan and R. F. Gloag; "The Chairman," proposed by Mr. S. Ashmore, and responded to by Mr. R. Phillips. The toasts were interspersed with some capital songs. At the close of this part of the proceedings, there followed an amateur Christy minstrel entertainment, which was very creditably gone through. The hall was then cleared for dancing, which was kept up to an early hour in the morning.

Correspondence.

STEAM-JET EXHAUSTERS.

Sir,—I have read with great interest the correspondence in the Journal upon the steam-jet gas exhauster, and shall be very pleased to hear more about it, and hope some of our brother managers will enlighten us country men upon the subject at our next meeting in June. I should also be glad to know where they can be seen at work, as I think it is a step in the right direction, for some of the exhausters at present in use are anything but satisfactory.

A. Thomas.

Basingstoke, March 25.

THE GAS UNDERTAKING OF THE HALIFAX CORPORATION.

Sir,—It will probably interest some of your readers if you publish the accompanying copy of the receipts, expenditure, and analysis of the cost of the gas made at these works during the year 1874.

Although we have done, as you express it, "fairly well," I must confess, through circumstances over which I have had but an indifferent control, that there is still plenty of room for improvement, especially in the matter of leakage—11·32 per cent.

This amount of leakage will, no doubt, be reduced next year very considerably, when a seriously defective gasholder that has been at work up to the present date shall have been put into a state of thorough repair, and the indices of the fourth quarter shall not be taken nearly a fortnight earlier, as was the case for 1874.

I would not, however, have asked to occupy your space with these and the following observations, if I did not conceive that your remarks upon the working of the Halifax Corporation gas undertaking inferred that we have made only £5459 net profit during the past year.

We have in reality made considerably more, as large sums have been paid out of revenue on capital account, it being considered undesirable to increase the latter account, since it is already very large as compared with the productive power of the works.

And whilst the process of hindering the growth of capital account has been going on, we have not been, as you will see, unmindful of reducing our capital account by a sinking-fund and a depreciation-fund likewise, maintaining at the same time the stability of the works by the expenditure of thousands of pounds upon renewals.

George Dunbar Malam.

Halifax Corporation Gas-Works, April 9, 1875.

Halifax Corporation Gas-Works.

Receipts, Expenditure, and Analysis of Cost of Gas for the Year 1874.

	Receipts.	Expenditure.	Cost per 1000 made.	Cost per 1000 sold.	Average Price of Coal deliverd.
	£ s. d.	£ s. d.	d.	d.	s. d.
Income—					
Cubic Feet.					
195,137,800, ordinary consumers.					
20,363,300, public lamps.					
67,800, private lamps.					
3,244,000, the works.					
130,000, Beacon Tunnel.					
218,942,900					
27,969,100 leakage, 11 32 p. cent.					
246,912,000, total gas made . .	43,936 9 10½				
Meter-rents	2,297 2 11				
Residual products	10,162 11 6				
Other receipts	99 6 9				
Expenditure—manufacture, viz.:					
Wages	..	5,374 2 9	5·22	5·89	
Coal, 25,591 tons.	..	17,893 0 5	17·39	19·61	13 11·79
Lime and oxide	..	909 14 5	0·88	1·0	
Tools and materials.	..	1,025 16 11	0·99	1·12	
Maintenance—	..				
Maintenance and repairs . . .	..	5,127 12 10	4·99	5·62	
Meter inspectors and general workmen	..	1,452 12 0	1·41	1·59	
Salaries, rates, & general charges	..	3,163 17 2	3·08	3·47	
Proportion of general expenditure	..	2,250 3 0	2·19	2·47	
Gross profit, £19,298 11s. 3½d., or £9 7s. 6d. per cent. . . .	56,495 11 0½	37,196 19 9	36·15	40·77	
Interest	..	9,573 0 9¾	9·31	10·49	
Depreciation	..	1,352 16 2			
Bad debts and discount . . .	..	1,197 2 5			
Sinking-fund	..	1,716 10 5			
Balance, net profit, or £2 13s. p. cnt.	..	5,459 1 5¾			
Deduct—	56,495 11 0½	56,495 11 0½	45·46	51·26	..
Residual products, £10,162 11s. 6d.	..	..	9·88	11·14	..
			35·58	40·12	..
			2/11·58	3/4·12	..

Geo. Haigh, Borough Accountant.
Geo. Dunbar Malam, Engineer and Manager.

March 29, 1875.

METROPOLIS GAS COMPANIES BILL.

Sir,—I shall feel obliged if you will kindly allow me space to say a word or two on this matter in your next publication.

The provisions of the bill do not affect the provincial gas and water companies; nevertheless, as the principle is so objectionable, I think it necessary to call their attention to it.

The bill is promoted by the Corporation of London and the Metropolitan Board of Works, ostensibly for the purpose of placing all the London companies under uniform conditions, or, in other and more appropriate words, to override all the conditions upon which the several companies have subscribed their capital, and establish others without their consent.

A word or two in explanation, as to the practice of Parliament in these matters, may be necessary, to enable those who are unacquainted with it to understand what is intended by an objection on principle, and this I will endeavour to supply.

When Parliament have granted powers to a commercial undertaking, and authorized the raising of capital upon certain terms and conditions, it has hitherto been the practice, invariably, not to revoke, or interfere with, those terms and conditions without the consent of the parties themselves, but if they at any future time apply to Parliament for further powers, then to consider the whole matter open for reconsideration, and,

if necessary, to impose fresh terms; but even then—and it is important that this should be borne in mind—if fresh terms are considered desirable, they are merely proposed to the parties as a condition of the further powers they are asking for being granted, and it is entirely at their option either to accept or reject them, as they think fit. If they accept them, their bill is passed; and if they reject them, their bill is reported as "preamble not proved," and they go on as before. In no case are the terms imposed upon the parties without their consent, and this is the principle that Parliament always adopt in dealing with commercial undertakings.

By this bill, the Corporation and the Metropolitan Board, disregarding the practice of Parliament, are not, be it remembered, opposing bills promoted by the companies, but promoting a bill of their own, to override all the conditions upon which the companies have subscribed their large capital—about £12,000,000—and substitute others which, if sanctioned, will entirely change the character and, to a very large extent, depreciate the value of the investment.

It is unnecessary to describe what the present or proposed conditions are, as they do not affect the principle, which is:—

Are the local authorities to be permitted to drag the companies before Parliament, and have the terms upon which they have subscribed their capital discussed and altered from time to time, whenever and as often as the local authorities think fit?

Or, are the companies to be left, as heretofore, in the quiet possession of their rights and privileges, until they come before Parliament again for further powers?

Anything more opposed to the practice of Parliament, or more inconsistent with the laws and customs of England, or more unjust in principle, than the proposals contained in this bill, it is scarcely possible to conceive, and the mischief that might result to all the provincial companies—and, in fact, to all commercial undertakings authorized by Parliament—if such a principle were sanctioned by Parliament, can hardly be exaggerated. It is to be hoped, therefore, that all persons interested in commercial undertakings will manifest their disapproval of it on the second reading.

The bill relates solely to the metropolis, and as there are many special circumstances relating to the supply of gas to the metropolis which do not affect the provinces, it ought not to be drawn into a precedent for the provinces. It is, however, much to be feared, that if it does pass it will be held to justify similar applications from other parts of the kingdom, and cause no end of trouble to the provincial companies.

W. Livesey, Secretary.

Gas and Water Companies Association,
Victoria St., Westminster, S.W., April 10, 1875.

Employment of Electricity for Cutting Wood.—A new kind of saw, based upon the employment of electricity, has been recently invented in the United States. To the blade of the saw is attached a strip of platinum wire, heated to a white heat by a current of electricity. This wire is stated to penetrate with astounding rapidity into the hardest woods. According to the inventor, the electric saw answers perfectly for cutting up trees, while, owing to the fineness of the wire, it is capable of giving to the material operated upon the most fanciful shapes. The strip of platinum, it is true, slightly chars the surface of the wood, but the loss resulting from this in working is said to be no greater than when the ordinary saw is employed.

Monochromatic Light.—At the *conversazione* of the Hastings and St. Leonards Philosophical and Historical Society, on the 6th inst., Mr. A. H. Wood, A.I.C.E., the manager of the Hastings Gas-Works, read a paper on this subject, of which the following is an abstract:—Exactly 200 years ago—viz., in the year 1675—Sir Isaac Newton published his wonderful experiments on optics; they were first presented to the Royal Institution, and to a great extent have been received down to the present day. Some of Newton's deductions have been replaced by other theories, but mainly, up to the present day, the experiments and theories of Sir Isaac Newton stand out as the great authorities in this branch of physical science. Now, one of the principal theories brought before the scientific world in the treatise I have named, is that of the decomposition of pure white light. He allowed the sun to shine through a small hole in his shutter, he then took a prism, through which he allowed the light to pass, and he found then that the white light, after passing through the prism, was not only bent out of its curve, but that it was split up into a coloured band exhibiting the consecutive colours of the rainbow in beautiful order. This coloured band Newton called the solar spectrum, and with this spectrum we must now have a little to do. Not only did Sir Isaac decompose the rays of the sun so as to break them up into primitive colours, but he carried his experiments further by looking at the coloured band through another prism. He then saw, not the beautiful coloured band, but a spot of pure white light, so that he became convinced not only that white light was composed of a beautiful mixture of colours, but that it could be pulled to pieces and laid out in its primitive colours; and, again, the colours could be collected together, and pure white light be formed. Having shown, by an experiment, how the colours of the spectrum, when brought upon the eye, produce the effect of white light, Mr. Wood said: Having now shown how pure white light is made up of various colours, allow me to say that those colours must always be in their proper proportion to constitute white light; each colour has its own degree of refrangibility, and it is in this degree alone that pure white light is constituted. I might here give you the exact proportions of each colour, if the time would permit of it, but I prefer rather to use my time in attempting to show you an experiment—very imperfect, I confess, for I have not the apparatus at hand to show it properly—relative to the decomposition of a ray of white light, and to break it up into its seven primitive colours. . . . After the second experiment the lecturer made a few remarks on the component parts of light, or rather the making use for illuminating purposes of any one of those parts. It is a question, however, he said, if it be possible to get any one ray of light entirely apart from others of a different refrangibility; still near enough for our purpose, I dare say, we shall be able to procure a light of one refrangibility so as to give an illustration or two in reference to it. This, however, must be borne in mind, and it is the great feature in monochromatic light—or light of one colour—that no body, unless self-luminous, can appear of a colour not existing in the light that it receives. For instance, did not the solar light contain every colour in itself, nothing that was of a colour that it did not contain could be distinguished by its light. Were the solar light all red, the beauties of nature would become a blank, and our green fields be lost to view; or, again, if the solar light were all green, all other colours would be compelled to give way, and only that which is in itself green be seen in its true colours. A yellow light was then made to illuminate the room, and Mr. Wood, continuing his address, said: You will soon perceive that there will be an approximate absence of all distinction of colour, except that which borders on the yellow. Any coloured fabrics that I may show you will lose their distinctness of colour, flowers, fruit, and even our own countenances will immediately look different, and we shall hardly be able to distinguish one another. Several interesting experiments were then made, and carried out successfully. A vote of thanks was cordially passed to Mr. Wood for the instruction, blended with amusement, which he had imparted.

Parliamentary Intelligence.

HOUSE OF LORDS.

Thursday, April 8, 1875.

The Chairman of Committees informed the House that the promoters do not intend to proceed further with the Stafford District Water Bill during the present session.

The Lord Chancellor acquainted the House that the further Standing Orders, applicable to the Cleveland (Skelton) Gas Bill have been complied with.

The Greenock Water Bill was read the third time, and passed.

The British Gas Company (Norwich Station), Carmarthen Gas, Colchester Gas, Leicester Water, Oxford (Corporation) Water, Pontypridd Water, and Truro Water Bills, brought from the Commons, were read the first time, and referred to the examiners.

The petition of the Corporation of Barrow-in-Furness for an additional provision in their bill, together with proposed amendments annexed thereto, was read and referred to the examiners.

Friday, April 9.

The Cleethorpes Gas, Hindley Local Board, Kilmarnock Water, and Longton Gas Bills, brought from the Commons, were read the first time, and referred to the examiners.

The Cardiff Improvement, Inverness Water and Gas (Purchase, &c.), and Inverness Water and Gas (Works, &c.) Bills were referred to a Select Committee, consisting of Lord Mont Eagle (chairman), Viscount Canterbury, Lord Elphinstone, Lord Foxford, and Lord Hammond, to meet on Monday, April 12.

HOUSE OF COMMONS.

Monday, April 5, 1875.

The British Gas Company (Norwich Station), Colchester Gas, Oxford (Corporation) Water, and Pontypridd Water Bills, were read the third time, and passed.

The Cleethorpes Gas, Hindley Local Board, and Kilmarnock Water Bills, as amended, were considered; to be read the third time.

METROPOLIS GAS COMPANIES BILL.

The second reading of this bill was deferred from April 6, to Tuesday, April 13.

Mr. Young gave notice of his intention, on the second reading of the bill, to move—"That it be read a second time upon this day six months."

Burghs and Populous Places (Scotland) Gas Supply (No. 2) Bill.—The second reading of this bill was deferred from April 27, to Tuesday, May 4.

The following petitions have been withdrawn:—Samuel Jones, as against the Manchester Corporation Water and Improvement Bill; James Brockbank, Bootle Union Rural Sanitary Authority, and Furness Railway Company, as against the Milom Gas and Water Bill; London and North-Western Railway Company, as against the Peterborough Water Bill.

Tuesday, April 6.

The Truro Water Bill was read the third time and passed.

The Broadstairs Gas Bill, as amended, was considered; to be read the third time.

The Maidenhead Water, and Ossett-cum-Gawthorpe Local Board Bills were reported.

The petitions of the Great Western Railway Company against the Slough Water Bill, and of the Worksop District Local Board of Health against the Worksop Water Bill, were withdrawn.

The Birmingham (Corporation) Gas, Birmingham (Corporation) Water, Birmingham and Staffordshire Gas, Birmingham Gas (No. 1), and Birmingham Gas (No. 2) Bills have been referred to a committee, consisting of Mr. Waterhouse (chairman), Mr. W. H. Gladstone, Mr. Whitelaw, and Mr. Errington, to meet on Wednesday, April 14.

The Oldham (Corporation) Water, Pontefract Borough Extension, Worksop Water, Blackburn Water, and Chelsea Water Bills, have been referred to a committee consisting of Mr. Knatchbull-Hugessen (chairman), Sir William Cuninghame, Mr. Clarke, and Mr. Sheil, to meet on Thursday, April 15.

Wednesday, April 7.

The Ashton-in-Makerfield Local Board Bill, as amended, was considered. Amendments made, and bill to be read the third time.

A petition against the Peterborough Water Bill was presented from ratepayers and inhabitants of Peterborough.

The petitions of the Lancashire and Yorkshire Railway Company against the Bradford Water and Improvement Bill; and of Susannah Gill and Isaac Holden against the Chelsea Water Bill, have been withdrawn.

In the case of the Peterborough Water Bill, the *locus standi* has been disallowed of the corporation and ratepayers of Peterborough, except as against so much of the bill as affects the district within the jurisdiction of the mayor, aldermen, and burgesses of Peterborough.

In the case of the Longwood Gas Bill, the *locus standi* of the following petitioners has been disallowed:—(1) Corporation of Huddersfield, except as against so much of the bill as affects the district within the jurisdiction of the Corporation of Huddersfield; (2) Inhabitants of Lindley-cum-Quarmby, Huddersfield; (3) Slaithwaite Gaslight Company, except as against so much of the bill as affects those parts of the townships of Linthwaite and Golcar which are now supplied with gas by the petitioners.

Thursday, April 8.

The Cleethorpes Gas, Hindley Local Board, Kilmarnock Water, and Longton Gas Bills were read the third time, and passed.

The Pemberton Local Board Bill was reported.

The Peterborough Water Bill was reported; preamble not proved.

The petitions of inhabitants of Thames Ditton and neighbourhood against the Chelsea Water Bill; and of the Earl of Stamford and Warrington against the Manchester Corporation Water and Improvement Bill, have been withdrawn.

POLLUTION OF RIVERS.

In answer to Mr. Kay-Shuttleworth,

Mr. Sclater-Booth said he was unable to say on what day he should be able to introduce the bill to prevent the pollution of rivers promised in the Queen's Speech, but he hoped to do so next week.

Friday, April 9.

The Broadstairs Gas Bill was read the third time, and passed.

On the motion of Sir Charles Forster, it was ordered that the minutes of the evidence taken before the committee on the Stockton and Middlesbrough Water Bill, in session 1864, be referred to the committee on the Stockton and Middlesbrough Water Bill.

The Greenock Water Bill (Lords) was read the first time, and referred to the examiners of petitions for private bills.

The petition of Vice-Admiral Tennyson D'Eyncourt against the Market Rasen Water Bill has been withdrawn.

Saturday, April 10.

The petitions of Oliver Holt and owners of lands in the township of Spotland, against the Rochdale Improvement Bill, have been withdrawn.

HOUSE OF COMMONS COMMITTEE.

MONDAY, MARCH 15.

(*Before Admiral* EGERTON, *Chairman*; *Mr.* ASSHETON, *Viscount* NEWPORT, *and Mr.* HOPE-JOHNSTONE.)

NEATH DISTRICT WATER BILL.

Sir EDMUND BECKETT, Q.C., and Mr. MICHAEL were counsel for the promoters; Mr. VAUGHAN RICHARDS, Q.C., and Mr. SHIRESS WILL appeared for the Corporation of Aberavon; Mr. THOMAS appeared for Mary Grant and others; and the Hon. GRANVILLE SOMERSET, Q.C., and Mr. THOMAS were counsel for the Corporation of Neath. Mr. Edward Acland was represented by Mr. BELL, parliamentary agent, and Messrs. Robert Nichol Byass and Co. and the Great Western Railway Company by Mr. POPE, Q.C., and Mr. SAUNDERS.

Sir E. BECKETT, in opening the case for the promoters, said that this was a bill for supplying the districts around Neath with water. In one of those districts was situated the town of Neath, and below it there was a town called Briton Ferry. Those two places, under an Act of Parliament, had for some years past a water supply of their own, which was obtained from some ponds in the neighbourhood of Neath, called the Gnoll Ponds. They were sufficient for the supply of Neath some years ago, but the committee would find from the evidence that they were inadequate now. There was a Neath Water Company, a small concern, and at a certain time it was found desirable that the water supply should be increased in order to supply Briton Ferry, which is below Neath, and for this purpose about £5000 capital was added to the existing capital, making a total capital of £10,000. It was seen, however, that the supply to Briton Ferry would be much more unprofitable than the supply to Neath itself, and although there was only one water company at Neath, the dividends from the two sources were kept separate. Last year the Corporation of Neath being dissatisfied with the supply of water, both in quantity and quality, brought a bill into Parliament asking leave to buy up the water company, or rather the profitable part of it, at Neath, and to take the supply into their own hands. That was resisted, as it always was. No bill had ever yet been passed, giving a corporation compulsory powers for taking over gas or water. The promoters last year entirely failed, and their failure was remarkable, because there was no possibility of disputing that the water supply was bad. He was the counsel for the company at that time, and he was obliged to admit this, but he was then prepared to assert that the company were improving their works. They required land for filtering, and they were deepening the ponds and doing all that was requisite at that time. Although he could not pretend to say that the works could be done then to supply water for years to come, yet the object of the company had been to deal with present wants, and they had dealt with them successfully, and the committee before whom the case was heard said that the time had not yet come for the carrying out of the petition. They saw that the works were sufficient, and they resolved that it was premature that any serious complaint should be brought before Parliament against them. Last year the company asked for further powers to make additional works, and accordingly employed the Messrs. Hawksley to go down and survey the district and see what was required to be done. They conceived it was obvious that some filtering beds would be required, and that more water would be necessary for Neath itself, and also for Briton Ferry, but when they came to inquire where the supply could be obtained from, they found that any additional supply by the enlargement of the existing works could only be temporary. After looking about the country, they came to the conclusion that the far better way was to adopt a comprehensive scheme which would supply Neath and Briton Ferry for some years to come, and which would also have the incidental advantage of supplying the other neighbourhoods which were more in want of water than even Neath and Briton Ferry. In 1873 a sanitary report was made on these adjacent places, showing a deficiency of the water supply. Some of the places were supplied from small springs percolating through the soil, the water being conveyed by small tubes or pieces of tin, around which, in summer, were to be seen about 20 persons waiting to fill their pitchers and vessels. Other sources consisted of small pools or wells about a foot deep. Where brooks passed through the villages, they were fouled by springs and other offensive matter. Other supplies were impure, being contaminated by filth which was thrown into them. The report further stated that a supply could be got by carrying out works at a small cost, by laying down tanks, by sinking wells, or by erecting pumps. When the committee came to hear the evidence they would find that any idea of obtaining a proper water supply in that way would be entirely visionary. The report further stated that at Skewen a large supply was necessary to render the place healthy, as the stream which ran through the village was an open sewer, and was a great nuisance. The committee would have no difficulty in coming to the conclusion that if these were merely agricultural places it would be necessary to give them a further supply of water, but this was by no means their position, for it was as thickly crowded a mineral district as was to be found almost, either in England or Wales. It had not increased so rapidly as some places, but it might be spoken of as the Middlesbrough of Wales. Within the memory of some, Middlesbrough had only a population of 130, now it had a population of 30,000 or 40,000, and Stockton, an adjoining town, had increased in the same way. The district proposed to be supplied by the bill had a population of about 44,000, which was increasing. As a mining district, it was very valuable. There were all sorts of mineral works there—such as tin-works, copper-works, and a variety of others, all of which required a supply of water which they had not at present. At Aberavon, the water was obtained from a trough supplied by a small pipe which conveyed it from a spring, or two springs, which were sometimes dry when the water was most wanted. Under these circumstances, nobody would say that it would be wise to carry on the ponds for a few years. The proper way was to go into a neighbourhood where there was an abundant supply, and to erect comprehensive works which could be done at a moderate cost. The capital proposed by the bill was £150,000, which included the buying up of the water company. There was a population of 44,000 at Neath, which was rapidly increasing. Taking it at 50,000, and calculating the expenditure at £3 per head, that would give £150,000. It was well known that water-works constructed at anything like that cost answered very well. Reasonable rates could be imposed, so as to give a fair dividend. The old company had altogether a capital of £15,000, which was quite exhausted. Two things might have been done—the old company might have been enlarged, but that practically meant asking the shareholders of the old company to take a very much larger share of the capital than they were able to do. When their capital of £15,000 came to be multiplied by 10, which would be the amount required in this case, practically speaking the old company could not be expected to find capital to that extent. They were in a great measure local people, who had no doubt small investments that suited them well, but who were not in a position to go into a large scheme like this. The other alternative was, that a new and much larger company was to be formed, and was to swallow up and absorb the old company, guaranteeing them their present dividend. Some of the petitioners did not understand the meaning of the bill, and thought that some of the members of the old company were to get some bonus out of it; but that was entirely a mistake. If the committee found that the proposed districts could be supplied for £3 a head, he trusted they would come to the conclusion that the scheme was a good one; £4 a head was considered a small sum, and in some instances the cost of water supply was a good deal more. The complaints against the bill were various, and related principally to the sources of supply. The watershed of the two rivers which run through the district—viz., the Pelenna and the Avon—embrace nearly 20,000 acres, of which 4800 belong to the Pelenna, and over 15,000 to the Avon, or in the proportion of 3 to 1. It was not proposed to take any water that actually ran down into the Avon. The supply was to be taken from the Pelenna River, on which there was proposed to be constructed a bifurcated reservoir, which was to store 2,500,000 gallons a day out of the 7,500,000 gallons of the Pelenna. Out of the 2,500,000 gallons proposed to be taken, the promoters engaged to give back again 1 million to run down the stream, because at some periods of the year the Avon was so dry that the inhabitants in the district practically got nothing out of it. It was proposed to make an enlargement in the Pelenna River, which would catch the floods, and as soon as the reservoir was filled the overflow would go down the Pelenna just as it would do if there were no reservoir at all. Out of the ordinary flow of 7,500,000 gallons it was proposed to take 2,500,000; that is to say, one-third would be taken, leaving two-thirds. That would be just reversing the ordinary course. The usual course was to take two-thirds, and to leave one-third for compensation. To put it in another way, only one-twentieth of the total flow of the two rivers would be taken, leaving 1 million gallons a day flowing down the Pelenna at a time when they at present got nothing. That would leave them a great deal better off than they were at present. If the whole of the water in the two rivers had been taken, which amounted to 30 million gallons a day, on the ordinary reckoning the promoters would only have had to give back one-third, instead of which they gave 19-20ths. He had never in his experience had a case where a bill interfered so little with the existing water supply. The Corporation of Neath thought that they would somehow be prejudiced by the bill, and would be in a better position with the old company going on. The works of the old company would still go on, as Parliament was told they would last year. The construction of the filtering-beds would be proceeded with, and ponds deepened as far as they could be. The promoters did not at all mean to supersede the old water-works, or interfere with them unnecessarily; but they would be very insufficient, and therefore, if they were kept on, it would be as a supplement to the larger scheme. In addition to that, it was apprehended that the old company might slip out of existence before a new company could be secured. It was proposed by an alteration in one of the clauses of the bill to keep the old company in existence to give a supply of water until the new company was formed on a proper basis, which ought to be satisfactory to the old company. As to the proposed scheme, the promoters, on account of a hill, were obliged to make a branch down to Aberavon and Cwmavon, and when it entered Briton Ferry there was a service reservoir. Then following the levels, Neath was reached, the existing supply being proposed to be kept up from the ponds. Then Skewen and all the district would be supplied, leaving Neath with its present supply until the new company was formed. The scheme was a tolerably simple one, and small in proportion to the population, and having regard to the extreme want of water in the district and the nature of the present works. The learned counsel then dealt with the petition of the Neath Corporation, some of the allegations in which, he said, were pure mistakes. He admitted all that the petition alleged as to the insufficiency of the water supply. It was true that the water was sometimes deficient and sometimes bad. The committee were told that last year, and that steps were being taken to improve the supply, and they were satisfied. Mr. Hawksley was sent down as soon as possible, and the result of his visit was the introduction of the present bill. The petitioners alleged that the works proposed by the bill were faulty and defective in an engineering point of view, and that the proposed scheme was extravagant, and the cost considerably under-estimated. He thought that the committee would be of opinion, unless some wonderful engineer was to be called by the petitioners, that Mr. Hawksley could judge as well as anybody of what the probable cost of the works would be. Mr. Hawksley had often been charged with extravagance in cost, but very seldom with under-estimating. The petitioners had held a meeting, the essence of which was that they did not wish the bill rejected, but that they wanted as many clauses as they could get; and the mayor, who was an old friend of his (Sir Edmund Beckett's) in a professional capacity, knew that the way to obtain these clauses was to go in for a good strong opposition. In fact, the opposition by the corporation was only to the clauses. There was another petition against the bill by the Corporation of Aberavon, in which they alleged that there were other sources of supply than those mentioned by the bill, and that a supply could be obtained at a smaller expense than that named in the bill. There were, no doubt, some springs or streams near Aberavon from which some water could be obtained, but that would not be sufficient for a large scheme like that proposed by the bill. The petition further alleged that mains were proposed to be laid only in a small portion of the borough. But the promoters were only asking at present for parliamentary powers to lay their main supply-pipe, and the subordinate works would be carried out afterwards. The only other opposition to the bill was by the Governor and Company of Copper Mines in England, and Messrs. Nicholl, Byass, and Co., who, he hoped, would not find it necessary to pursue their opposition. If they satisfied the committee that the quantity of water to be sent down the stream was not enough, no doubt further supply would be granted.

The first witness called for the promoters was

Mr. *G. Llewellyn*, examined by Mr. MICHAEL.

I reside at Blagden Hall, near Briton Ferry, and have lived in the district all my life. I am a magistrate for the county of Glamorgan, and the chairman of the rural sanitary authority. My jurisdiction extends to the limits of the whole of this scheme. Excluding Neath and Briton Ferry, the inhabitants of the district get their supply principally from the springs in the neighbourhood, but that supply can by no means meet their wants. At present the water is supplied at various distances from springs, and the hillsides for the most part, and the inhabitants are often obliged to wait for a considerable period for their turn in order to get the water. I belive in some localities they wait far into the night before they can get what they want. As chairman of the rural sanitary authority of the district, this want has been brought under my notice, especially in certain localities. As far as I have made myself acquainted with this scheme, I have no doubt it will fully meet the wants of the district. All the portions of the district which have not an urban sanitary authority are governed for sanitary purposes by the rural sanitary authority, of which I am chairman. There is a village adjacent to Neath, called Skewen, the population of which is increasing. Neath Abbey and Skewen are in juxta-position, and are inhabited chiefly by a mining population and artizans. The supply of water is very bad, in Skewen in particular; nothing can be worse. We were to take means to procure a supply of water when we heard of this scheme which led us to abandon any further steps. If the scheme is carried out, every house in Skewen will be supplied. Skewen is rather in a difficult position with regard to level. It stands on sloping ground. I think the inhabitants would be very glad of and thankful for a supply of water. I know Aberavon. The inhabitants there are very badly supplied indeed. They would be truly thankful for a better supply. I know the river Avon, and have observed its conditions at various periods of the year. At some periods of the year it is nearly dry, and very frequently quite dry, while it passes through Aberavon. The water is by no means fit for drinking. It receives the drainage of various works in that neighbourhood, and the drainage of a number of houses. It is totally unfit for drinking purposes. Aberavon lies lower down, almost on the sea coast. It is at the end of the river Avon, almost before it empties itself into the sea. Before it comes to Aberavon it has to pass through Cwmavon, in a locality containing a population of about 10,000. The drainage of the houses occupied by that population flows into this stream. When the river comes down to Aberavon it is totally unfit for drinking purposes. It is greatly discoloured. The Pelenna is a beautiful mountain stream. The inhabitants of Aberavon applied some time ago for permission for a supply from Mr. Talbot's estate near Cwmavon, but he refused them permission. I have been informed he afterwards told them that they could procure water from another place, but not from the same place as they originally wanted to resort to. The population of Aberavon chiefly consists of miners and artizans.

It has now between 3000 and 4000 inhabitants. There are tin-plate works at Aberavon. There is another place called Taibach, near Aberavon, which is much in want of a supply of water. Last year there were 70 or 80 cases of typhoid fever there. The outbreak was attributed to the absence of pure water. A report was made to that effect by the medical officer of health. If this scheme is carried out there will be a sufficient supply of pure water to Taibach. The whole of the district is inhabited by a mining population, requiring a great deal of water. The line of pipes will pass through the middle part of my property. There is a natural supply of water for my house and for the inhabitants round about, but we are greatly in apprehension that we should lose that supply because there are collieries in the place, and the underground works will tap the springs and take away the supply, but the proposed scheme will make us independent of the springs and will be a very great blessing to the whole of the district.

Cross-examined by Mr. RICHARDS: The rural sanitary authority are the proper parties to prescribe water for the district. The Corporation of Aberavon are no doubt the sanitary authorities. They may supply water to the town if they please. If the mayor and corporation do not do it, the inhabitants will be thankful for others to do it. I am aware that a system of drainage has been introduced into Aberavon by the corporation. It has been well done, and the town is very much improved in consequence. The places I have been speaking of keep on increasing in size. Aberavon has slightly diminished of late years, in consequence of some works not prospering. Apart from that, the place itself is increasing, and drainage and sanitary works ought to go on as the population increases.

Mr. RICHARDS: And any drainage works, or works of that sort conducted by the sanitary authorities, are conducted by borrowed money, and charged on the rate?

Witness: I am not in the council, and I do not know whether that is the case or not with them, but that is the usual course. I do not know that until very recently the corporation were limited in their borrowing power to the extent of the annual assessment in the place. They have spent a considerable sum of money recently at Aberavon, but I do not know how much. A portion of the town is already supplied with water, but very imperfectly; so much so that, from my own observation, I saw the inhabitants in a certain locality were in want of water, and I made them a present of a pump myself, at my own expense. The corporation, I have been told, are in negotiation with Mr. Talbot for a portion of land from which they can have water, and also for land for the construction of a reservoir. I only heard this recently, but I know something of that particular locality alluded to, and I do not think the ground asked for would be sufficient to yield the supply. There are no other springs in the neighbourhood of Aberavon except those on Mr. Talbot's property which can be utilized. Mr. Talbot promised to supply Taibach.

Mr. RICHARDS: Was that from the same spring of the watershed from which he proposed to supply water to the Corporation of Aberavon?

Witness: It was not. Taibach has nothing to do with Aberavon. They are neighbouring places, but Taibach is not under the jurisdiction of the Corporation of Aberavon.

Mr. RICHARDS: Why do you say you do not think this spring on Mr. Talbot's land would be sufficient for the corporation?

Witness: From my own observation. I think the springs are weak.

Mr. RICHARDS: But if they have a reservoir, that reservoir, being filled, will amply supply the town of Aberavon.

Witness: That will be very doubtful. I have no interest in the new company. Perhaps water from the coal beds would run into the Pelenna. The people of Aberavon would not have it from the coal measures if they could help it. They will be glad to have water from where they could get it.

Mr. RICHARDS: Do you not think that they would rather have it from their own sanitary authorities, the corporation?

Witness: I should think the reverse.

Mr. RICHARDS: The proposed main enters Aberavon. What power would the people living at a distance have to insist upon a supply of water?

Witness: It would have to be conveyed through various streets.

Mr. MICHAEL objected to the question being put, because, if the bill passed into law, there would be power to compel the company to supply water within its limits.

Mr. RICHARDS: Not unless they can provide a certain return upon the expenditure.

The COMMITTEE ruled that the question should not be put.

Witness: It is a question I cannot pretend to answer. The Aberavon scheme seems to be a sort of branch of the general scheme. There is no chance of the Pelenna water being carried off by mining underground. No doubt water coming out of the coal measures is very offensive, and will not do for culinary purposes. The drainage of Aberavon is tolerably good.

By Mr. SOMERSET: I live within four miles from Neath. I know nothing about the affairs of the Neath Water Company. I had no interest in the contest of last year. I only know that Neath has not a proper supply of water.

By Mr. POPE: The two rivers, the Avon and the Pelenna, are in a different valley from the river that runs through Neath.

Mr. POPE: Do you know if it is the general practice of Parliament to allow companies to go out of their own district into other districts for the water supply, if their own district is not sufficient?

Witness: I believe it is common to allow them to go out of their own district if they cannot get water elsewhere.

Mr. POPE: Have you considered the question whether there are sources of supply for Neath which they might entertain without interfering with the Avon or the Pelenna?

Witness: I have not taken that view of the subject at all.

Mr. *Reginald Warren*, examined by Mr. MICHAEL.

I am agent to Lord Dynevor, who has large estates at Neath, near Cadoxton and Skewen, and considerable mining and manufacturing works are carried on on these estates. There are collieries, iron-works, copper-works, etc. The population of Cadoxton at the last census was 8700. Taking that portion of the parish which is immediately in contiguity to Neath, I should say there would be about 3000 of population. The population of Skewen, at the last census was 3120, and is increasing very fast. The population of Llansamlet is a little over 6000; only part of that parish is near the watershed. The population is increasing. The want of water is felt at Skewen very much. There are no artificial means of supply. The supply at present is from small springs, and is quite insufficient. There is only a very small quantity of the water fit for drinking, and the water is so limited that the inhabitants have to wait their turn for hours at the well.

Mr. MICHAEL: Do you think this scheme, if carried out, will be a boon to the district in supplying them with water?

Witness: Undoubtedly.

Cross-examined by Mr. SOMERSET: The parish of Cadoxton goes far up into the hills, about 12 miles from Neath. There are several hamlets in the parish, although Skewen is the only village. I am not aware that the Briton Ferry Company have any power to supply Skewen. Part of Lord Dynevor's property is in Skewen. I know that the rating power in the bill is limited, but I do not know the sum of money wished to be raised. I do not know any of the gentlemen mentioned in the bill.

Mr. *H. Campion*, examined by Mr. MICHAEL.

I am surveyor and sanitary inspector to the Neath Rural Sanitary Authority. It comprises within its limits the Neath Union with the exception of the towns of Aberavon, Neath, and Briton Ferry. They are excepted because they are under urban sanitary authorities. The districts within our authority are Cwmavon, Neath Abbey, Skewen, Llansamlet, and Taibach and Tylaid. I am also surveyor to the Neath Highway Board. It is part of my duty to carry out the provisions of the Sanitary Act. It is one of the duties of the sanitary authority to see that the inhabitants are supplied with water, either by themselves or by water companies established in the district. The area of the district under my control is a little over 220 square miles, with a population of 47,000. I have reported to the General Board of Health in London as to the water supply of these various districts. Skewen and Neath Abbey are extremely badly supplied with water. The only supply is by one or two small springs that rise up in the gardens of the houses, and meander by the side of the road. There are other supplies that rise up in small holes or wells about 12 inches deep, which is taken out by utensils, which causes the water to become soiled, and the people have sometimes to wait their turn for several hours. I have reported to the sanitary authority as to the bad supply of water, and they have taken means to give a better water supply, but they have been intermitted by the progress of this bill. If this bill is carried into law, it will give full means of supply to this population, and would confer a public benefit. It would have been a very difficult matter to get a supply for these two places in the district. The whole of it is on the coal district, which renders it difficult to construct any reservoir in which to impound water. Llansamlet is badly off for water, and the same conditions obtain there, and there is an urgent necessity for obtaining a better supply. I know Taibach; there has been an outbreak of typhoid fever there, which was mainly attributable to the deficiency of water. Since the outbreak the condition of things has not been remedied, and I consider that a better supply should be obtained for the place. I have investigated this scheme, and submitted the deposited plans to the rural authority. The plans were very carefully examined and laid before them, and the board seemed very favourable to it. I am well acquainted with the district. I have been there for 13 years. The district is mountainous, and the rainfall is heavy. I have noticed the position of the Pelenna and the Avon. The water in the Avon is unfit for drinking, because a great part of the drainage from Cwmavon discharges into the river. When the river is down to Cwmavon, many of the privies drain right into it. I know the Pelenna. It is a clear mountain stream, at considerable elevation, very much smaller than the Avon. Owing to the short distance these rivers have to run, although they are in flood they very soon subside, and in a dry season there is very little water in them. The Pelenna becomes very nearly dry. I had occasion to cross it some time last summer, and it was very nearly dry then. At that time there had been drought for about a month or six weeks. The construction of the proposed works would be an immense benefit to the neighbourhood.

By Mr. SOMERSET: I know nothing of the powers under which the Neath and Briton Ferry districts are supplied.

By Mr. SAUNDERS: A great part of the course of the river Avon is dry during the dry season, especially between the Pelenna and the Avon and Aberavon. A certain portion of the water would be taken into the Cwmavon works. I do not know if the whole available water of the river passes through the works. I believe that the company's works are stopped during the dry season because the total flow of the Avon is not sufficient.

Re-examined by Mr. MICHAEL: My evidence is based upon facts coming under my observation as inspector in the rural district. I know as a fact that below Cwmavon all fish have ceased to dwell in the river Avon.

Capt. *Gwynn Lewis*, examined by Mr. MICHAEL.

I am the chairman of the local board, and chairman of the school board. I am also captain of the fire brigade at Briton Ferry, where I have resided for about ten years. It is situated at the entrance to the port of Neath. The population is very dense, and is chiefly engaged in mining and artizan pursuits. There are collieries and works of various descriptions all round this district, employing a large population, which is constantly increasing. There are some patent fuel works being established, and the Great Western Railway Company are about to make extensive repairing-sheds in the neighbourhood. A bill was passed last Parliament with respect to the improvement and enlargement of the docks. Briton Ferry lies in a valley, with mountains round it, the highest of which are 1000 feet and upwards, and rise very rapidly. The prevailing wind is westerly, and the rainfall is very large. It has rained almost every day for the last three months. I think it is one of the wettest districts in the whole of England; yet, with all that water, there is not sufficient water supply.

Mr. MICHAEL: "Water, water everywhere, and not a drop to drink!"

Witness: The population in that district require a larger supply if they can get it. The iron-works company send for drinking water to a considerable distance. I believe they keep a man doing nothing else. The river at Aberavon is not in a fit state to be used for drinking purposes. The Avon gets dry in dry weather as far up as the mountains. In some places the water sinks into the gravel. There is an Act for supplying Briton Ferry with water, but the supply is not sufficient for the inhabitants. There is a reservoir connected with the works. If this bill were carried, it would be a great boon. As one of the sanitary authority, I have had my attention called to the necessity for a better supply of water to the district; and if this scheme is carried out, I think an adequate water supply will be obtained.

Cross-examined by Mr. SOMERSET: We should be happy to pay a good price for water. There is a company which has to supply it to Briton Ferry under Act of Parliament. I do not say it has the proper powers, but Briton Ferry is not properly supplied. I do not know if the Great Western Railway Company have an independent supply of water from Lord Jersey.

By Mr. SAUNDERS: When we made complaints at Briton Ferry, this bill was the answer to our complaints, and we thought it was a very fair bill. We were not consulted in reference to the proposed works under the bill. It was only after the money bill that we came to the conclusion that we should be prepared to support it. We have given no instruction to any engineer to prepare plans for the supply of Briton Ferry with water since I have been at the board. There is a mountain between the two districts to be supplied.

Re-examined by Mr. MICHAEL: As far as Cwmavon and Aberavon are concerned, the district supply is in accordance with the watershed area.

Mr. MICHAEL: With respect to the supply of water in your district, under the Public Health Act you can take no measures for eventuating a supply of water while there is a water company supplying water in the district?

Witness: I believe we can not.

Mr. *Howel Cuthbertson*, examined by Mr. MICHAEL.

I have lived in Neath the whole of my life, and am well acquainted with Neath and the surrounding district. I am coroner of the western division of the county, which comprises the whole of the district to be supplied by the bill. I am also clerk to the Neath Guardians and the rural sanitary authority, and a member of the Corporation of Neath. Aberavon and Taibach are very badly off for water. The previous witnesses have been correct in saying that the inhabitants are dependent upon springs at Skewen and Neath Abbey. I live between Neath and Briton Ferry. There has been an increase in the population of Briton Ferry since 1871, and there must be a larger increase still, as there are a large number of works being built there now. At present, the house accommodation is exceedingly limited. I have known cases of 17 persons sleeping in two rooms in one house. Houses are now springing up in the neighbourhood. The feelings of the Neath people are generally in favour of the bill, and they believe it will confer a great public benefit. There was an outbreak of typhoid fever at Taibach last summer, which I attribute to the deficient supply of water. This want would be removed if the bill were passed into an Act, and the scheme carried out.

Cross-examined by Mr. RICHARDS: Aberavon is not in my district as coroner. Mr. Talbot undertook to supply Taibach with water, but he has not done so.

Taibach is separated from Aberavon by the river Avon. Taibach is supplied from an adjoining valley, but the water is impure, and not the water Mr. Talbot would supply. Taibach is not within the jurisdiction of the authorities of Aberavon. I do not know whether Aberavon would be a remunerative place for the water company to supply.

Mr. RICHARDS: At all events, it will give you an opportunity of expending your capital?

Witness: I suppose so.

By Mr. SAUNDERS: I do not know what the state of the Avon would be if there were no works on it. I am aware that the works are stopped in the dry season.

Cross-examined by Mr. THOMAS, witness gave evidence as to the calling of the meetings of the inhabitants for the purpose of obtaining their views upon the proposed bill.

Mr. THOMAS: As regards Neath, the effect of the substitution of this scheme for the present scheme is that, whereas, at the present time, they are on the point of getting the rate reduced with no longer delay, by the proposed scheme they will be put off for a number of years.

Witness: Of course they will. Whether the corporation purchase it or do not purchase it, if things go on as at present the reduction will take place. Of course any diminution in the public rates and burden would no doubt be very acceptable. I read the discussion on this bill last year in the House of Lords Committee. At that time a bill was introduced for the purchase of the water company by the corporation. I did not hear Mr. Hawksley's evidence. I am aware it will take seven years to make the proposed new works. I think it necessary and desirable that there should be filter-beds. I contemplate that it will be necessary in the intervening time to lay down filter-beds to filter the existing supply; but if the corporation purchase, the power to lay down filter-beds would be withdrawn, owing to a clause in the lease.

Mr. THOMAS: If the bill passes, the Neath people must for seven years have no filter-beds?

Witness: Not necessarily; if they do not lay them down they have power to do so.

Mr. MICHAEL objected to this sort of evidence without the production of the lease. The promoters would take care that if the bill passed there would be a clause inserted to give a pure supply to Neath in the intervening period.

Re-examined by Mr. MICHAEL: The whole of the capital has been expended, and there is no power, without money being raised, to do what the company propose to do.

Mr. THOMAS objected that the finances of the company should be spoken to by a gentleman who had no connexion with it.

By Mr. MICHAEL: I heard in the committee of the House of Lords last year that the whole of the capital was expended, and without fresh powers the company could not do that which was necessary to give a proper supply. I am aware that there has been a petition presented by some of the inhabitants of Neath in favour of this bill.

By the COMMITTEE: The water of the Pelenna is not, as far as I am aware, polluted by any mineral works.

Mr. *Anson Routledge*, examined by Mr. MICHAEL.

I am a fog signal manufacturer at Neath, and have resided there 24 years. I am well acquainted with the surrounding districts. I know the rivers Pelenna and Avon. They are simply mountain streams. [The witness corroborated the statements that had been made as to the character and position of the streams.] The Cwmavon works are 10 miles from the source of the river Avon. It is one of the wettest districts I was ever in. Under these circumstances it would be very easy to fill a reservoir with water. The want of water is felt in the district, because it runs rapidly away. There is no means of getting it. It would be a benefit if the supply of water was regulated. The source from which the Neath Water-Works Company obtain their supply is good, so far as it goes, but is insufficient for the wants of the town. It is on the Gnoll estate. [The witness was then examined as to the meetings that had been called with reference to the promoting of the bill.]

Cross-examined by Mr. THOMAS: We want a better water supply, and the more the water-rate is reduced the better.

Mr. *William Gaffy*, examined by Mr. MICHAEL.

I am a tin-plate manufacturer in the neighbourhood of Aberavon, and have resided there for many years. I am the owner of freehold lands and houses in Aberavon. I have let land on building leases on which about 40 houses have been erected. For the last nine years I have been a member of the corporation, and for the last six years an alderman of the borough. I am well acquainted with the surrounding district, and know the rivers Pelenna and Avon. I agree with the description that has been given of them by the previous witnesses. There are about 600 houses in the borough, with an average of about five persons to a house, making a population of between 3000 and 4000. The district round is rapidly increasing. There are no works for the public supply of water, except a small tank, with an inch pipe, which conveys the water from the mountain side. The want of a proper supply of water has materially affected the interests of the town. I had an application for ground for the erection of works, but the negotiation fell through in consequence of the deficiency of the water supply. There have been some sanitary arrangements effected. I believe there are water-closets in all the houses, but they are only water-closets in name, and dry closets in reality. The water of the river is unfit for drinking purposes. It is sometimes so dry in summer that I could walk dry-shod up the river for a mile. I think the Pelenna is the only source of supply for the district. I believe if this scheme were carried out it would be a great public benefit. The Pelenna has natural springs, and in the dry season the flow would be more continuous.

Cross-examined by Mr. POPE: I ceased to be a member of the corporation last November. I was on a committee appointed to consider the supply of water. We did not tell the corporation where we could get water for Aberavon, because we could not find it. The reason we did not go to look at the Pelenna was, we had not anything like sufficient water for the scheme. We went to look for water within half a mile of the town. There is a small steam there which is about 300 yards long from its source to the river Avon. From this stream, a 3-inch pipe would suffice to convey the water in the wettest weather. I do not know how much could be impounded. That is the only scheme I heard mentioned by the Aberavon Corporation.

Mr. POPE: Do you know any other scheme?

Mr. MICHAEL objected to the question, because the petitioners had not, in their petition, set out other sources of supply, of which the promoters could avail themselves.

Mr. POPE said that he would not press the question.

The CHAIRMAN said that the committee were satisfied with the evidence so far as it related to the deficiency of supply.

Mr. POPE said that if the committee would read Mr. Hawksley's evidence of last year, they would, perhaps, be of a different opinion.

Mr. MICHAEL said that last year the attention of the committee of the House of Lords was directed specially to Neath, whereas the proposed supply was intended for the whole of the district, of which Neath only formed one portion, and that entirely altered the state of affairs.

Mr. *Griffiths*, examined by Mr. MICHAEL.

I am a builder, and have lived in Aberavon for 55 years. I agree with what has been stated by former witnesses as to the deficiency of the supply of water in Aberavon for building purposes. In 1867 the corporation compelled the connexion of water-closets with the system of sewage, but no water has been laid down to supply the water for the closets which have been so compulsorily enforced upon the inhabitants. The tank with the 1-inch pipe, constructed by the corporation, was the only source of supply in the town. I believe if water is taken from the Pelenna it will be a great benefit to the district.

Cross-examined by Mr. RICHARDS: I am not a member of the corporation. There are a few springs in the neighbourhood of Aberavon, but it is questionable, if they were brought into the town, whether they would be sufficient for the supply of water. At all events, that supply would not be sufficient to flush the water-closets. The river is, at the present moment, employed to flush the drains, but it would be at too low a level to flush the closets. I have heard within the last nine days that the corporation have been in negotiation with Mr. Talbot for the purchase of land. I am not in the habit of laying out waterworks.

Mr. MICHAEL: Leaving this scheme out of consideration, do you know of any other sufficient to supply the inhabitants of Aberavon?

Witness: I know of no other.

TUESDAY, MARCH 16.

Mr. *Charles Hawksley*, examined by Sir E. BECKETT.

I am in partnership with my father. I was desired last autumn to visit the district in which the water-works are to be constructed. My father had previously visited the place. At first the idea was to take an additional site for the reservoir on the Gnoll estate. After an examination to ascertain the capabilities of the estate, it was found that reservoirs could only be made there at great cost, and they would be small in capacity; and we then turned our attention to a point west of Neath, on the slopes. That was found to be less eligible than Gnoll. We then looked at the Pelenna site, which has been brought before Parliament, and it was found that a reservoir could be made which would impound three times as much as could be impounded at Gnoll, and four times as much as was possible at Llansamlet. This proposed scheme will supply a greater number of the population of Neath. The area of the Pelenna River is 4800 acres. The whole of that is not utilized by the reservoir. It can only utilize 1500 acres, and only 1000 of that for the district, and the other 500 is proposed to be given for the supply of compensation. The Avon drains the valley parallel to that of the Pelenna, into which the Pelenna eventually discharges. The Avon joins the Pelenna above the copper mines, and above the Cwmavon works. There is an acreage down to the point where the Cwmavon people take their supply from the Avon, of 4800, of which we shall utilize only 1500 acres. As to the size of the reservoir, it will hold 404 million gallons, and it will supply the various places mentioned in the plan. From the Pelenna reservoir, the water will be taken by the pipe following the valley of the Avon, and at the Cwmavon works it turns off towards Neath to the valley between the two mountains where there is a short tunnel, and the water is delivered into the subsiding reservoir. From the Cwmavon works the water is taken down to Aberavon. If the reservoir of 400 million is full, it will supply a population of 80,000 people with 25 gallons per head per diem for 154 days. That is the period over which the drought will extend in the driest seasons. The rainfall is taken from the average of the three driest consecutive years; and the greatest drought during that period will not exceed 154 days. If more gallons per head are required, it will be for a smaller population. Water will be taken into the reservoir whenever it can be obtained from the heavy floods until it will hold no more, and by the provisions of the bill we shall send a million gallons down the stream on all working days. That will be a great benefit. It is always found that, after one-third of the quantity of the available rainfall has gone down, there is a great benefit to the millowners, inasmuch as they then have water impounded for them that they cannot use, and given out to them when there would otherwise be a scarcity.

Cross-examined by Mr. SAUNDERS: I know the works of the Governor and Company of Copper Mines in England. I have been through part of them. I have seen the stream of water that passes through the works. They have two streams—one coming from the Pellenna and the other from the Avon. I have not seen them in the dry weather; it was wet weather when I was there. I do not know how the water is provided. Sir Edmund Beckett was not correct in suggesting that the river was perfectly dry in the dry weather, and that the Governor and Company of Copper Mines in England could get no water. There is no time when there is no water in the river. In the dry weather the river is practically dry, because the water has previously gone into the works. The works must necessarily be reduced in dry weather. In point of fact, the winter flow through their works is greater than it is in dry weather, but they cannot utilize all that they get in winter. The quantity that can be utilized at the Cwmavon works is 24 million gallons per day. No doubt they would have less than they want if the quantity is reduced to 8 or 10 million gallons. The whole of the drainage area of Pelenna is 6100 acres, and at the point where we propose to place the embankment we propose to take 4800, but we can only utilize 1500 acres, and you will have the benefit of the remainder. The population has increased rapidly. The introduction of water-works often causes a much more rapid increase of population than would otherwise be the case. The present population of the district which we shall be able to supply is 44,000. I have not calculated the population of Aberavon separately. My estimate was given to me by a gentleman who took the figures from the census, but corrected them up to the present time. It is impossible for me to go down there to collect information. It is usual to take the census returns and correct them. 44,000 is the population of the district at present, and an allowance of 30 gallons per head would be only 1,320,000 gallons. I am not prepared to speak with respect to the number of gallons to be obtained from the Gnoll estate. A gentleman who will follow me will no doubt be able to inform you upon that point.

By Mr. RICHARDS: I know Aberavon. I saw the place where the people were standing collecting water by the wayside. I do not know the number of wells in Aberavon. I have no notion at all as to the number. I understood that the corporation had made two tanks. I do not know of any more. They are placed where the people have to wait and get their water. My object in going to Aberavon was first to see if a better supply of water could be obtained for the population; and secondly, because the promoters thought such an undertaking would pay. The site lies out of the direct road to Neath. Taibach, which was described as being in the valley of the Avon, lies a little to the east of Aberavon. It lies a little to the east of the river Dufferin, and Aberavon lies a little to the west or right bank of the river Avon. The supply for Taibach would naturally come from the waters of the Dufferin, but you could not get it without making water-works. With regard to our supply, the distributing-pipes are not shown on the plans—they are not so required by the Standing Orders. We propose to give a constant supply of water. We do not bind ourselves by the Act in that respect. My father, who introduced the constant supply system more than 40 years ago, never made any water-works, except upon that principle. Filtration is not one of the things required to be indicated on the plans. If it is necessary to filter the water, it will be filtered, but I do not think it will be necessary. The water of the Pelenna will clear down by the time the water is drawn out of the reservoirs. If the water is at certain times at all discoloured by the coal workings, the whole of the discolouration will have subsided before it is drawn off. Last year my father appeared on behalf of the Neath Valley scheme. I was not personally connected with the case, and cannot answer as to the quantity of water which he stated could be supplied. You will have an opportunity of asking my father.

By Mr. THOMAS: Having first looked for a site on the Gnoll estate, we subsequently came to the present site, because we shall be able to get not only a greater quantity of impounded water, but also a much larger quantity from the district; and we can have a larger reservoir. Our intention was to supply Aberavon and Briton Ferry, and that was an additional reason for selecting the pre-

sent site. The acreage of the surface will be 58 acres, the depth of the water impounded will be 90 feet, and the bank will be 95 feet high. There are two surface reservoirs; they are small, merely for the purpose of equalizing the flow, and maintaining it in the event of the interruption of the main-pipe. The Baglan surface reservoir contains half a million, or rather 570,000 gallons, and the Skewen contains half a million gallons. It is about 11 miles from Pelenna. The total estimate of the cost is from £120,000 to £136,000. That does not include the cost of distribution. It includes the main-pipes, but it does not include anything for the cost of filtration. Then the bill provides a large additional sum for all these charges. I have expressed the opinion that the outlay would be one that would undoubtedly pay. There is no doubt that it will, judging from the character of the district. That opinion is based upon a supply to the present population of 44,000, and it is calculated that the supply will be sufficient for 80,000. As regards the 44,000, I am not personally responsible for that estimated number. By this scheme we propose to give Neath a duplicate supply. The main-pipe, in going from Pelenna to Skewen, passes through the town of Aberavon. It is part of the scheme of the company to give a duplicate, and they do not propose to give up the existing, supply. There is no provision in the scheme for filtering the water. In the calculations, no provision is made for filtering the water supplied to the Neath people during the time the new works are in course of construction. The estimate only includes that which is required by the Standing Orders.

Sir E. BECKETT: What we lay before the committee is the bill and the plans required by Parliament. That does not include filtration. Mr. Hawksley has said that can be done if necessary. It is no part of the scheme.

Mr. THOMAS: It is quite sufficient for me if it is said that it is no part of the scheme during the construction of the works.

Re-examined by Sir E. BECKETT: The size of the main-pipe running through Neath is 14 inches in diameter. I believe we can supply Aberavon with water more cheaply than they can do it themselves. We do not compel them to take water. No one is compelled to take a gallon of water. But, no doubt, when good water is offered to them at the price we shall be able to offer it, they will take it. That has been the case in most instances. Well water of towns is not generally very good. All that we do with reference to a constant supply is that we absolve ourselves from penalties in case we cannot always give a constant supply. The water has to be turned off only for repairs, and for connecting services. It is not to be turned off for more than one hour, or one hour and a half at a time. The constant supply system is the most economical mode. Less water is used in furnishing a constant supply than otherwise. The Water-Works Clauses Act of 1847 provides that water should be laid on constantly to reach the highest houses, unless it is otherwise stipulated. Even where originally the suppliers have been under the penalties imposed by that Act, or have been left to that Act, it has been found necessary to relieve the company or corporation—very frequently a corporation—from the obligations of the constant supply, because it places them under great penalties and risks.

Mr. *Thomas Hawksley*, examined by Sir E. BECKETT.

My son has been acting with me in the present case. I wish to add some figures to what has been said. We have to find what amount of water can be impounded in any particular situation where we want to make a reservoir. The rule we adopt is this—we find the duration of the drought, that is to say, what months are dry, which means the number of days from the last overflowing till the water begins to ascend again; and in this case it is 154 days. In some cases where the rains are less frequent there is a much longer drought. I will show you how we get at these facts by an explanation of the diagram before the committee. In some parts of the country the drought continues for 250 days. The rainfall is small in the midland counties compared to what it is in Wales. From observations we have made, the rule adopted enables us to determine in every case with great exactitude the number of days the drought will continue; and by the application of that rule we have found that the available rainfall is 32 inches. The duration of the drought—the period from the last overflowing of the reservoir to the commencement of another rise—is in dry years 154 days. The process we adopt to give compensation to manufacturers on the stream is the same as that which has been settled in numberless cases by Act of Parliament, that is one-third of the available rainfall that we take. The available rainfall is determined by the magnitude of the reservoir, and in this case it is 32 inches. We give the ordinary compensation, according to the parliamentary rules, to the Governor and Company of Copper Mines. The quantity of water coming off the watershed through a steep valley like this varies as 400 to 1 by actual measurement—*i.e.*, that, if in dry weather one million gallons come off, in a great flood there will be in the same time as much as 400 million gallons. These large volumes that slip by with very great rapidity, cannot be taken into account. The only way in which the corporation could put themselves in a better position than we are in would be to expend a large sum of money on a reservoir, and then they could not make a large reservoir capable of dealing with these large floods. If we expend, as we shall have to expend upon this reservoir, only about £80,000, why, of course, if they want to utilize for themselves the whole of the water of that valley, which is even three times as much as we require, they must expend a quarter of a million. Taking the whole year round, they will be much better off with our works than without them.

Cross-examined by Mr. SOMERSET: I first became acquainted with the promoters scheme about October. We examined a great many other places previously, and they proved to be either inadequate for the purpose, or so amazingly costly that they could not be brought before Parliament, and at last we found the present situation, which offers all the requisite facilities for the supply of water. I do not think the scheme was proposed before October. It might have been in September. I went down for the Neath District Water Company first. That is the name which is to be assigned to the company which now proposes to carry out the scheme in the bill before the committee. The Neath Company is not the company promoting the bill. The Neath Company has so large an interest in the bill that they may, in a technical sense, be termed the promoters, but they are not the statutory promoters. The promoters are not only the three gentlemen named in the bill, they are only a few amongst others. I can give you some of the other names. I have voluntarily become a shareholder, and there is Mr. Baxter; but I have never interested myself to know who the other promoters are. I am not, nor was I, the engineer of the old company. The old company have generally been advised by Mr. Williams. I have only been called to look over their drainage-ground, and to advise them upon matters which may be said to be beyond engineering matters—on parliamentary questions, and on questions of policy and management, and so on. I appear only as the company's consulting engineer. I have never directed the putting a spade into the ground for them. I appeared only as their consulting engineer before the parliamentary committee last year. I have never acted for them constructionally. The old company not only knew in October that this company was coming forward with a new scheme, but they were and have continued to be interested in it. I do not know whether the terms have been settled with the new company. All I can tell you about it is that I advised the course that is now being adopted. Of course I communicated that advice to the old company as well as to the new. I do not know that the old company pay a 10 per cent. dividend to their shareholders; in fact, I know quite the contrary, they paid 10 per cent. upon a portion of their undertaking, and nothing per cent. upon the other portion. The capital of the two companies, the Neath and the Briton Ferry, is separated, I think, simply as a matter of account. I have no knowledge of the circumstance that if a bill of the corporation was lodged, an arrangement was to be come to between the two companies—the Neath and the Briton Ferry—by which water was to be abstracted from the Neath pipe, and to be taken to Briton Ferry, the Briton Ferry guaranteeing payment to the Neath undertaking. That must have taken place before I was called in. I am not sure that it was proposed to take water from the Neath pipe to Briton Ferry. My remembrance, so far as anything of that kind occurred, was that the Neath Company, at that time, proposed, or had it in their minds, to make more works upon the Gnoll estate, and if they had done that, and could have got the water, there is no doubt but that they could have united the Briton Ferry with the Neath pipes, and have supplemented the Briton Ferry supply from the Neath supply.

Mr. SOMERSET at this point referred at some length to the evidence given by Mr. Hawksley before the parliamentary committee, which last year considered the Neath Company's scheme, in order to show that he now had quite a different estimate of the sum required to provide a water supply for Neath.

Mr. MICHAEL then stated that as the Governor and Company of Copper Mines of England had been satisfied that no injury would be done them by the promoters, they had withdrawn their petition.

The CHAIRMAN: As to the whole of the bill?

Mr. MICHAEL: Yes.

Cross-examined by Mr. RICHARDS: I know Aberavon. I do not know anything about the wells and tanks constructed by the corporation. I have understood that they have made two. We are not going to supply Aberavon as an outlying place. We shall supply it direct from the same main pipe coming from Neath. We come out from, or meet with, a distinct branch from Aberavon. But it is not so in reality, and in an important sense, because there is a line of road along which nearly the whole population lies, which extends from Skewen on the one extremity to Margam on the other extremity, and that line of the road will become occupied by important works and the consequent population. It is our intention to supply the whole of that population, and the line of pipe which is now referred to is only a line fitting into that general main. The line leading down to Aberavon is not a distinct branch—it is a feeder into the general system of distribution. The general system ends at Margam on the one side and Skewen on the other. It is a branch, but not a distinct branch, as it supplies the population on its way. It does not affect Neath at all. The total population which we propose to supply is 44,000 immediately, and in the future about double that number. The population increases rapidly. I do not know the number of acres included in the district to be supplied. I dare say I could tell you how much was in the Avon valley, and how much belonged to Neath, because we have to describe the parishes to which the supply will be given. The number of the population was obtained from the census, which was corrected up to the present time. For Cwmavon the estimated number was 7000; for Neath, 11,000; for Cadoxton, 3000 only; Skewen and Llansamlet, 5000; Briton Ferry and its neighbourhood, 5000; and Neath, Margam, and a other place, 13,000; making up the total of 44,000. The area of the watersh is 4786 acres; and the capacity of the proposed reservoirs is 404 million gall... The water surface is 58 acres, and the depth at the embankment end is 90 feet. I could give the various dimensions of the embankment by means of paper. The embankment is 5 feet above the water. The slope is 3 to 1 inside and 2½ to 1 outside. At the top of the dam the width will be about 24 feet. The size of the main by which we propose to supply Aberavon from our main will be 10 inches, but we do not bind ourselves to that. It is to be 10 inches all the way from the main line to Aberavon, a distance of 3000 yards, nearly two miles. When it has gone through Aberavon, it does not diminish, but it spreads. From the reservoir down to the point of junction at Aberavon it is 14 inches. There is no system of filtering at present. Filtering is no part of our intention. The water is so good that it will not require to be filtered. Filtration works are not required to be shown on parliamentary plans. We mean to give a constant supply, but we do not mean to bind ourselves to it; and for this reason only—we become, if we bind ourselves to give a constant supply, insurers of insurance companies; and if they can allege any defect, at the moment that a fire occurs, in our system of supply—and remember we are not free to say that there is no water at the time the fire breaks out—they can have action over us in the name of the person whose premises are burnt. That never was intended by the Water-Works Clauses Act, but by the loose words used, the judges put that construction upon it. And, therefore, since the occurrence of the great fire at Newcastle, have not availed ourselves of the provisions of the Water-Works Act; and although we intend to give a constant supply, we take care not to bind ourselves to it. The income that we calculate the company will earn from the whole of Aberavon fro the supply of the population and for trade purposes will ultimately be from 3s. 6d. to 4s. per head of the population. As to what it will pay on the capital, suppose we take the £60,000 at 4s., that would be £12,000; our working expenses would be about £2000, and that would leave £10,000. Supposing we expend in the first instance £150,000; of course, if we take from £10,000 the £1000 we should have to pay Neath, it would leave £9000 as interest on £150,000—about 6 pe cent. The calculation last year of 2s. 6d. was upon the population only; bu if we supply water for trade purposes, as we do at Stockton and Middlesbr... and that is to become a large manufacturing place, it would elevate the 2s. 6d. to 4s. I can tell you what we shall get from Neath now if you give me the accounts. It has an income of £1600 gross a year from 16,000 people. That is more than 2s. 6d.; it is about 3s. The net income, I suppose, would be from the £1000 a year just spoken of.

By Mr. MICHAEL: Aberavon is nearer to our works than Neath itself, it is nearer to the reservoir than Neath. If we exclude Aberavon we exclude all the portion beyond it. From inquiries as to the water supply to Aberavon, it appears that the supply is almost nothing, and in some parts the people are in the greatest possible distress for want of a proper quantity. The Gnoll estate have the power to draw off a water supply from the 6-inch main-pipe of the Great Western Railway Company.

The CHAIRMAN: With regard to your changed opinion in the case of the Neath water supply, is that mainly owing to the discovery of the fact that there has been an abstraction of their water?

Witness: Not entirely.

The CHAIRMAN: Mainly?

Witness: I cannot say mainly. The Neath Corporation were at that time endeavouring to buy so much of the water-works as related to Neath only. Of course, in a purchase of that kind, nothing had to be taken into account except the views and wants of the existing population; but, of course, when I had to go down in reference to the scheme now before the committee, I had to inquire what was likely to be the future of Neath. And if I put the actual existing population of Neath at present at about 12,000 people, and its future population at about 20,000 or 25,000, it will be seen that our purpose is different from that of the purpose of the bill of last year. I had to take the future of Neath, Skewen, Briton Ferry, and other places into account, and what was good and sufficient in one case is far from good and sufficient in the other, and the question I had to consider last year was quite different to the question I have to consider at the present moment. I have a much larger question before me now. I have not only had to consider the additional places, but have also to take the future of Neath for 20 or 30 years into account. It is a totally different question.

By the COMMITTEE: I understood just now from your son that it was his opinion that the constant supply system was more economical than the intermittent system.

Witness: That is so, if the proper regulations for its supply are enforced. That is so important a matter that you will pardon me if I explain it to you. At a certain town in Oxfordshire they now give a constant supply, and allow 125 gallons per head per diem; that is because the proper rules and regulations for that supply are not acted upon. In Cambridgeshire, at a similar town, in almost all respects, and with nearly the same population, the whole water service is carried out with 18 gallons per head per diem.

By the COMMITTEE: Do I understand you to say that more water need not be used in the constant supply than in the intermittent supply?

Witness: That I have no doubt about. I have had experience in many of the large towns in the kingdom, and I can give you an example, which occurred four years ago, which will bear me out.

By Mr. MICHAEL: I have not seen the Pelenna River in dry weather, but I am perfectly familiar with the yield in these mountain districts. The rainfall in the Pelenna valley is 55 inches, of which 32 would be available. There is a gauge kept at the Glen valley, and there are a number of gauges distributed over South Wales at various elevations. Mr. Glaisher, who is the chief of the Meteorological Department, has been down there for us, and he will bring it before you, and will give you a full description of his mode of procedure. We know that the evaporation is 14 inches. It varies in England from about 10 inches to even as much as 18 inches. That happens at this very place. In similar mountain places we have 14 inches. I cannot give you any precise information about the quality of the water; but you will hear Dr. Voelcker, an analytical chemist. I know something about the impurities that are said to get into the water, and can tell you about their action. There is no iron in the river at the place where the embankment will be constructed. We have a great number of acres of mountainous land, and upon those mountains there is more or less peat. Filtration will not remove peat. It will remove any matter that is held in suspension. The mineral matter is not an artificial, but a natural substance. It is entirely natural. The coal works will affect the water in a certain way by contributing a certain portion of water to the stream. But as the stream yields over 8 million gallons per day on an average, the effect will not be very great. There is, however, a certain amount of artificial matter coming into the water. It is not from manufactures; it simply comes out of the ground. The ground contains iron, and the water runs through that portion of the ground, and of course carries with it some of the iron matter. The coal-works are about a mile from the proposed reservoirs. There is another stream which goes into the Neath River, and that is not a clear stream.

Mr. MICHAEL (to the committee): I shall be glad if you would ask Mr. Hawksley if the bill does not provide for the regulation of a proper supply of water.

Witness: That is shown in the 45th section.

Dr. *Voelcker*, examined by Mr. MICHAEL.

I am a Fellow of the Royal Society and professor of chemistry to the Royal Agricultural Society of England, and have had a large experience in the work of analyzing water. I have been frequently employed to analyze water. A sample was sent up to me from the water of the Pelenna spring. It was properly labelled. The quantity sent was two gallons, which is the usual quantity sent for the purpose of analyzation. The water sent to me from the Pellenna spring was fairly clear. It contained a small portion of suspended matter, but it was too small a quantity to be ascertained by weight. It could not be filtered and put in a balance. It contained no iron, either in suspension or solution. The matter found was a little inorganic matter; but it was not iron. The hardness of the water before it had been boiled was 2·3 degrees, after it had undergone that process its hardness was slightly diminished. It would be called extremely soft water, and would be very useful for cooking, washing, and for other domestic purposes. For drinking it would be perfectly wholesome water. The total quantity of solid matter contained in the water was $4\frac{3}{4}$ parts of a grain. That is a low proportion, and it would only be found in lake waters, and some of the springs in the gravel districts. In the London waters we have from 20 to 24 grains of solid matter in the gallon, and with respect to the hardest water there are about 13 to 14, and in the permanent hardness, from 6 and 8. Comparing the solid constituents of the samples of water from the Pelenna spring sent me and its hardness, it compares very favourably with the water supply of London. There are few waters which are so good as the sample sent me, except, perhaps, those from some of the Scotch lakes. As to the organic matter, there was scarcely a trace of ammonia to be found in it. I estimated the quantity of albumen, and that amounted to only a very small quantity, much less than is usually found in drinking waters. It is not a quantity that will in any way interfere with the water for drinking purposes. It is shown to be nearly free from inorganic mater. There is no sewage contamination to be seen. A further confirmation of that fact is seen in the constitution of the water. It shows that there is very little saline matter in it. The albumenoid ammonia amounted merely to the 1000th part of a grain. Practically there was but a mere trace of it, and that, with the absence of nitrate and chloride of sodium, showed a good quality of water. The other constituents found in the water were the usual normal constituents—a little carbonate of lime, a small quantity of magnesia, and a very small quantity of other mineral matter. The absence of mineral impurity renders the water very well adapted for domestic and manufacturing purposes. Whether for domestic use or for manufacturing purposes, I can recommend it to the committee as good water. It would be difficult to find more wholesome or purer water, or any that would be more generally adapted for ordinary purposes than this.

Cross-examined by Mr. THOMAS: I am not in favour of supplying water to towns without being filtered. It should be perfectly clear. I am a great advocate for the supply of filtered water to towns.

By Mr. WILL: I do not know anything about the water whence the sample submitted to me was taken. I made a full quantitative analysis of the sample. It is an advantage to have soft water for domestic purposes.

The CHAIRMAN: I do not wish to go into a long scientific question; but is it not alleged that soft water has a prejudicial influence on the system?

Witness: No; it is rather the reverse. This water is extremely well adapted for a town supply.

The CHAIRMAN: Do you recommend it for the use of this district?

Witness: I do not know anything about the district. The water is wholesome and pure.

The CHAIRMAN: Would you recommend it for the supply of London?

Witness: If I could get it, certainly; it is infinitely better than the London water.

The CHAIRMAN: You have had considerable experience in analyzing water for the supply of towns?

Witness: Yes.

The CHAIRMAN: Do you consider the sample as good as that usually submitted to you?

Witness: Much better. Of course I can only speak of this one particular sample.

The CHAIRMAN: Is the Glasgow water softer than the sample submitted to you?

Witness: Yes; slightly softer. Glasgow water contains only about 3 grains in the gallon, and this has 4 or 5; this would be harder water.

By the COMMITTEE: Filtration would remove mechanical impurities.

Witness: Yes; and a certain proportion of lime.

By the COMMITTEE: It would not make water, contaminated with sewage, wholesome?

Witness: No; it would purify it, but it would not render it wholesome.

By the COMMITTEE: I cannot tell how the Neath water compares with this?

Mr. *James Glaisher*, examined by Mr. MICHAEL.

I am a Fellow of the Royal Society, and have devoted considerable attention to the subject of rainfall. I have been to the district of the proposed reservoir, and have taken into consideration all the rain gauges that have been made near and about the place, and my calculation is that the average fall of rain on the average elevation of the gathering-ground is 55 inches. From observations made at Aberavon I find that the rainfall there is 45 inches. The prevailing character of the wind is west and south-west. The ground is so broken up in that district that it has quite an anomalous effect. You may find at a low elevation a greater amount of fall than even at a higher elevation. There are no gauges on the proposed site. I have been obliged to take it from observation. I saw the stream of the Pelenna River when I was on the ground, and collected a sample of it at a height of 340 feet above the level of the sea, at a point a little below where the embankment is to be made. I tasted the water, as I always do. It was taken from about 3 feet from the bank of the stream.

By Mr. SOMERSET: The collieries were working when I went there.

By Mr. WILL: I took the sample of the water from the stream just below the site of the intended embankment. I did not take any water from above that site. The water above that point seemed to be of the same quality. I saw some collieries at work in the morning. I cannot undertake to say that the collieries were working in the afternoon when I obtained the sample of water.

Mr. *William Mackworth*, examined by Mr. MICHAEL.

I assisted in obtaining a sample of the water of the Pelenna stream on the 10th of March. It was on Wednesday. I packed it myself to be sent to Dr. Voelcker. It was taken from a point just below the foot of the intended embankment. It was water that would have to be impounded for the reservoirs. The collieries were working on that day.

Cross-examined by Mr. WILL: There were no other places where we could have taken worse water. I did not at that time see water coming from the colliery levels; but I have very often seen it.

Re-examined by Mr. MICHAEL: The water that Dr. Voelcker examined was a somewhat unfair sample, as it was taken at a point close to the bank. It ought to have been taken from the middle of the stream.

Mr. MICHAEL here stated to the committee that the last witness concluded the evidence for the promoters.

(*To be continued.*)

Legal Intelligence.

YORKSHIRE SPRING ASSIZES.—LEEDS, THURSDAY, APRIL 8.

(*Before Chief Justice* COLERIDGE *and a Special Jury.*)

WRIGHT *v.* SHEFFIELD UNITED GAS COMPANY.

ACTION FOR ALLEGED NEGLIGENCE.

Mr. MELLOR and Mr. C. DODD appeared for the plaintiff; Mr. WADDY, Q.C., Mr. BARKER, and Mr. GOULD for the defendants.

Mr. MELLOR said the plaintiff was Mary Wright, a widow, who lived in Sheffield. Some time in 1874 she purchased the house 219, Rockingham Street, and she occasionally visited it, but her daughter, Mrs. Ashton, lived at it, and managed and conducted the household affairs. Along Rockingham Street the gas-mains were laid by the defendants, and from these mains the gas was carried into the house by means of pipes. The day before the explosion Mrs. Wright spent a great deal of time at the house, but she did not detect that the gas was escaping. After she left Mrs. Ashton's attention was called to the gas, which smelt a great deal, and she took precautions to prevent an explosion. She was unable to ascertain where the gas came from. She turned it off at the meter and kept very small fires in the rooms. She was much depressed by this state of things, and went and sat on the sofa in the dining-room. She stayed up the greater part of the night, being afraid to go to bed. She went to bed at half-past six o'clock in the morning, and when she got up again in the forenoon an escape of gas was still perceptible, and Mrs. Ashton was so much alarmed that she sent a message to the gas office to acquaint the officials. No one there took any notice, and a second messenger was sent, and about half-past five o'clock in the evening a gas man came and made an examination of the premises. While he was there a slight explosion of gas took place, and he then said he would go for assistance, and he went away. He returned in an hour and a half, and further examinations were made. Shortly after ten o'clock a serious explosion took place, and Mrs. Ashton was blown up the chimney. She was seriously injured. Her clothes were torn off her back. She was much bruised on the body, and one of her toes was fractured. One of the servants had her thigh broken, and the other persons in the house were injured, but not seriously. The house was damaged to the extent of £300, and the furniture, which was of a very costly description, was all destroyed.

The plaintiff's daughter, Mrs. *Ashton*, was examined at some length as to the facts of the case.

Witness was cross-examined as to the character of the house, and in reply to Mr. WADDY's question as to whether it was not really a house of ill-fame, she replied that she did not think so. If a person liked to come, he came, and if he did not he stayed away.

Mr. WADDY submitted that the plaintiff could not recover. She was not the occupant of the house, and he suggested that the furniture was not hers, but her daughter's, who was living apart from her husband (a cab driver in Sheffield), and could not maintain the action either. Apart from that, the gas company was not responsible for the escape. They used all possible diligence to prevent it, and the explosion was simply the consequence of the foolish conduct of the people in the house.

The further hearing of the case was adjourned until Friday.

FRIDAY, APRIL 19.

The plaintiff was called, and on her counsel, Mr. MELLOR, proceeding to examine her as to the value of the furniture in the house,

Chief Justice COLERIDGE said this inventory work should not be imposed upon him and a special jury; in fact, if it were insisted upon, he would adjourn the case, and proceed with the two others which still remained on the list for trial.

Upon this intimation the learned counsel conferred together, and afterwards consulted with the judge in his private room. Upon returning into court,

Mr. WADDY said he was prepared to offer certain terms, which, however, did not meet the views of the counsel for the plaintiff.

Chief Justice COLERIDGE said no one entertained a stronger opinion than himself against referring any case that ought not to be referred, or hurrying a case which required a long time for trial; nevertheless, it would be a weakness not to adjourn or refer one where the circumstances called for it. It was not for him and the jury to go through evidence with regard to each of the long list of articles—tables, plates, chairs, &c.—said to be in this large house at the time of the explosion. He must therefore insist on this case being referred.

Mr. WADDY said the object of the gas company in letting the case go to trial was not to test the value and existence of certain chairs, plates, &c. He would therefore be willing to waive most of these details, and proceed to the more general question, if the other side would agree to this course.

Chief Justice COLERIDGE said he thought that in its wider features the case was a very fit one for the determination of a judge and jury; indeed, if they could keep to that part of the case, no time or patience would be grudged by either in trying it; but the plaintiff's counsel knew his own case best, and if he thought it could not be tried without going through the list of furniture, that was not a case for them to try here.

It was then agreed that the case should be referred to Mr. Maule, Q.C., the JUDGE adding that all the cruel expense of such a case might have been avoided by either side going to a judge in chambers before the briefs were delivered. The wrong lawyers often got the blame for cases being referred. Counsel could not help it, as they had simply to go on with the cases in which briefs were handed to them, but other lawyers ought to have had more consideration before delivering the briefs.

WATERFORD PETTY SESSIONS.—FRIDAY, APRIL 2.
(*Before the* MAYOR, *Alderman* JACOB, *Captain* JOHNSON, *Dr.* SCOTT, *Alderman* REID, *Mr.* WALSH, *and Mr.* SLATTERY.)

CONVICTION OF THE WATERFORD GAS COMPANY FOR BREACH OF THE GAS-WORKS CLAUSES ACT.

The Waterford Gas Company were summoned for not having deposited their accounts with the clerk of the peace, as required by the 38th section of the Gas-Works Clauses Act, 1847.

Mr. STRANGE (solicitor to the corporation), having read the information, said: This company, though called the City of Waterford Gas Company, had its offices in Cork; its directors were all Cork gentleman; its shareholders resided in that city; the profits, though earned in Waterford, go to Cork, and are spent in that city. The monopoly exercised by gas companies attracted the attention of the Legislature nearly 33 years ago, and a public Act, the Gas-Works Clauses Act, was passed for the protection of the public. There had been previously no check upon the gas monopoly, but in that Act several wholesome provisions were introduced, one of which related to the lodgment of accounts with the clerk of the peace. This was required by the 38th section of the Act which he would read in full for them:—

That the undertakers shall, in each year after they have begun to supply gas under the provisions of this or the special Act, cause an account in abstract to be prepared of the total receipts and expenditure of all rents or funds levied under the powers of this or the special Act, for the year preceding, under the several distinct heads of receipt and expenditure, with a statement of the balance of such accounts duly audited and certified by the chairman of the undertaking, and also by the auditors thereof, if any; and a copy of such annual account, if the gas-works be situated in England or Ireland, shall be transmitted free of charge to the clerk of the peace for the county in which the gas company is situate, and such transmission shall be made on or before the 31st of January in each year, under a penalty of £20 for each default; and the copy of such account so sent to the said clerk of the peace shall be kept by him, and shall be open to inspection at all reasonable hours, on payment of 1s. for each inspection.

This Act was passed in 1847, and the Waterford Gas Company got their special Act in 1858, 11 years after. The second clause of the Waterford Gas Act embodied the whole of the public Act of 1847 in it, and they were to be read as one Act. The special Act also embodied the Railway Clauses Act, and it was under section 145 of that that the magistrates had power to act, and were bound to do so. He (Mr. Strange) might also mention that they had taken the advice of an eminent counsel, and were fortified by his opinion. He had given them further directions with reference to ulterior proceedings, which he did not deem it necessary then to refer to, but he wished to say a few words as to the position of the corporation. It did not come here merely as an informer to get the penalty of £20, and put that sum in its pocket; but it came there to uphold the law and to compel this company, which had so great a monopoly, to do its duty. The reason the corporation wanted the accounts was to ascertain what were the annual profits of the company. The Act provided—

Sec. 30—The profits of the undertaking to be divided amongst the undertakers in any year shall not exceed the prescribed rate, or where no rate is prescribed they shall not exceed the rate of £10 in the £100 by the year on the paid-up capital in the undertaking, which in such case shall be deemed the prescribed rate, unless a larger dividend be at any time necessary to make up the deficiency of the previous dividend which shall have fallen short of the said yearly rate. Secs. 31 and 32 allow the company "to form a reserve-fund out of such profits over the 10 per cent. until it amounts to 1-10th of the capital; when that is done the amount under sec. 35 shall be applied to make a rateable reduction in the price of gas."

It was therefore the duty of the corporation, and it acted solely with reference to the general good of the citizens, to compel this company to lodge the accounts, that it and the citizens might see what were the profits which had been earned, and whether they were applied according to the Act. The price of gas was higher in Waterford than in some other cities, and the gas company were now seeking by arbitration to get from the corporation, which represents the citizens, a higher price for gas than that which it considers fair and reasonable. These accounts were required to see if the promoters of the gas company were getting the dividend allowed by law, if they were putting into the pockets of the shareholders the money which ought to be given to the consumers of gas. Since 1858, a period of 17 years, the gas company had never made an affidavit to anything like punctuality in the lodgment of these accounts. On the contrary, it had persistently and continually refused to lodge any accounts. The corporation was the custodian of the general interests of the public, and was bound to intervene when these interests were menaced by the non-lodgment of the accounts. The corporation came forward to protect the citizens from an undue and severe monopoly. The gas company threatened to increase the price of gas, though they had never lodged an account, as required by law, and therefore the corporation interfered.

Captain JOHNSON: What will become of the money if they make more than 10 per cent.?

Mr. STRANGE: It must, according to the 30th section of the Gas-Works Clauses Act, be applied rateably to the reduction of the price.

The MAYOR: What will be done if the gas company elect to pay the £20 a year, and not lodge the accounts?

Mr. STRANGE: I believe we have an adequate means of making the company obey the law.

Captain JOHNSON: Is the penalty cumulative?

Mr. STRANGE: No; there is a clause in the Act which makes it necessary that every penalty shall be sued for within six months, and the company has screened itself behind that provision, and avoided all penalties since 1858. He hoped the bench would pardon a little digression. The action of the corporation was not hasty, for he had written the company, in February, the following letter:—

Waterford, Feb. 3, 1875.

Gentlemen,—I am directed by the Town Council of Waterford to call on you to lodge in the proper office within one week all the accounts of the receipts and expenditure or other matters required by your Act, and the several statutes relating thereto; otherwise proceedings will be taken to enforce the penalty you have incurred.—Yours obediently,
THOMAS F. STRANGE, Solicitor to the Corporation.

To the Waterford Gas Company, Waterside.

He (Mr. Strange) understood the accounts had reached Waterford that day, but he had not seen them; any way, the proceedings of the corporation were justified by having produced this result. The corporation did not want to be harsh and vindictive, but it wished to show these Cork gentlemen, who give our citizens the light of their gas, that they must comply with the law, and they cannot get out of a wholesome, and most desirable provision enacted by the Legislature to check undue monopoly.

The MAYOR: What reply did they make to your application?

Mr. STRANGE: The last reply I got was that this was a vindictive proceeding, and that the company would adopt measures of retaliation. I will read their letter.

Mr. THORNTON (who appeared for the company): I object to the letter being read, for it has nothing to do with the case.

Mr. STRANGE: Except in mitigation of damages.

Mr. THORNTON: Oh, then, you may read it in mitigation of damages.

Mr. STRANGE then read the letter from the company, as follows:—

Waterford Gas Company, Cork, March 29, 1875.

Dear Sir,—We expect the secretary will be at work in a few days, and that then he will send in an account he has been preparing for delivery, agreeable to your letters to us. If the corporation persevere in the course indicated, we would for our own convenience be anxious to have due and early notice. We trust, for peace sake, it will not be adopted, for most assuredly the company will have to adopt a most unpleasant retaliatory proceeding. We have advised them, in fact, to reimpose the meter-rents on consumers, and it will very much depend on your reply whether the steps will be taken.—Yours truly,
T. F. Strange, Esq. TRACEY AND NAGLE.

N.B.—We are quite aware who is inspiring these proceedings.

Dr. SCOTT: Does that refer to you?

Mr. STRANGE: I do not know to whom it refers.

The MAYOR: Are they not bound to lodge their accounts with the clerk of the peace before the 31st of January?

Mr. STRANGE: They are bound by the Act—clearly bound—to do so.

Captain JOHNSON: Suppose they make a profit of 12 per cent., are they bound to give the surplus 2 per cent. to the borough fund?

Mr. THORNTON: No, but to the consumers.

Captain JOHNSON: How will they do that?

Mr. STRANGE: By reducing the price of gas.

Mr. THORNTON: As the company never realized a profit of 10 per cent., they did not think they saw any necessity to send in their accounts to the clerk of the peace.

Mr. STRANGE: They should have done so under any circumstances.

Mr. THORNTON: I acknowledge that when they were asked to do so they should have sent in their accounts, and they would have done so on or before the 31st of January, only for the severe illness of their secretary, who was unable to make them out before that date. He did so as soon as he recovered, and Mr. Cook has them now in his possession. No doubt the penalty has been incurred, but, taking into account the relations between the corporation and company, I think they should seek to avoid quarrels. It would be hardly worth while for the corporation to seek to recover £20, especially as Mr. Cook has the accounts now in his possession.

Captain JOHNSON: I do not think we can hear the case until we have the accounts before us.

Mr. STRANGE: Are you going to dismiss the case, then?

Captain JOHNSON: I am not; but we should see if the accounts have arrived, and if the profits are over 10 per cent.

Mr. STRANGE: They had not arrived on Jan. 31, and might never have arrived had not these proceedings been instituted. It was only this day they arrived. Whether they were made up or not, when they were not lodged with the clerk of the peace, on or before Jan. 31, we are entitled to the penalty of £20.

The MAYOR: Did not the corporation apply for these accounts?

Mr. STRANGE: Yes; over and over again within the past year. I wrote to them in February.

Mr. THORNTON: I ask you to make no order on the case. The accounts have been lodged this morning. Why did not the corporation demand these accounts since 1858?

Mr. STRANGE: I was not in the corporation in 1858.

Mr. FISHER: Nor was I then in the corporation.

Mr. STRANGE: We do not so much look for the penalty as to have a record of it on the books.

Mr. THORNTON: I suggest that you make no rule till Mr. Strange examine the accounts.

Captain JOHNSON: Did the Act say that the penalty is £20, or any sum not exceeding £20?

Mr. STRANGE: The Act is imperative, and it distinctly says £20.

Mr. THORNTON: I think the illness of the secretary should be taken into account.

The MAYOR: The letter of the company to Mr. Strange, holding out a threat, was very injudicious.

Mr. THORNTON: Then you ought to take notice of it, and take care not to be charged meter-rent.

The MAYOR: The corporation may remit the fine if the magistrates impose it.

Mr. STRANGE: Yes, they may do so; but it is not a fine, but a penalty. The corporation may either return the money, or not levy it at all.

Dr. SCOTT: If you do not want to take the fine, it might be as well to settle the matter.

Mr. STRANGE: Oh, no. Let the penalty be awarded by the justices, and then let the corporation act as it thinks proper.

The MAYOR: We must impose the fine, and then the corporation may remit it or not impose it.

Mr. FISHER: The corporation can deduct the penalty from the gas accounts.

Dr. SCOTT: Cannot you adjourn the case till you examine the accounts? If the company promise to furnish the accounts every year, let the matter drop.

Mr. STRANGE: I have no authority to do so without an order from the council.

Mr. FISHER: We want to get the back accounts.

Mr. STRANGE: We can do that afterwards. The question now is to impose the penalty.

The MAYOR: I ask Mr. Thornton whether his company have any objection to furnish the back accounts.

Mr. THORNTON: I cannot answer that, unless I communicate with my clients.

The MAYOR: The bench have no option but to impose the penalty.

Mr. STRANGE: I may now say that one of the principal shareholders of the company is a contractor for the work here. I would not allude to that till the case was over.

Mr. HANRAHAN: Do you plead guilty, Mr. Thornton?

Mr. THORNTON: I do not. I simply say that we did not send in our accounts before Jan. 31.

Mr. *Cook* was then sworn, and deposed that he was clerk of the peace. The gas company ought to have lodged a copy of their accounts with him each year on or before Jan. 31, but they did not do so. He received a copy of their accounts for the past year that morning.

The BENCH decided that the penalty should be imposed.

Mr. FISHER: If they furnish us with their back accounts, I think the corporation will not enforce the penalty.

HAMMERSMITH POLICE COURT.—SATURDAY, APRIL 10.
(*Before Mr.* INGHAM.)

CAUTION TO GAS CONSUMERS.

The further hearing of the charges against *Henry Ward* and *Samuel Hoyland*, of being concerned in obtaining money by false representations, took place this day.

Miss *Ann Smith*, of No. 9, St. Phillip's Terrace, Kensington, said the prisoner Henry Ward called upon her last Wednesday week. She showed him into the dining-room, where he put a burner on the chandelier, and lighted the gas, putting a card over it, at the same time remarking there was no smoke from his, but there was from hers. He asked her how many burners she had. She said 13, but 12 would do. He said they were 36s. a dozen. She said she thought they were very dear. He replied it was no interest to him whether she had them or not, he was only agent to the gas company, and if she did not have them she would have to pay 7s. 6d. per 1000 for gas from the 1st of April. She paid him 36s. for 12 of the burners. She should never have had them unless he had said she would have to pay 7s. 6d. for gas.

Mr. *Thomas Carter*, chief inspector of The Gaslight and Coke Company, proved that he did not know the prisoners. He said he had issued circulars, stating in effect that, in consequence of the description of coal having been changed, new burners would in some cases be required. The company had not supplied new burners; the customers were left to find their own. The burners produced were suitable for the gas now made, but were too large for private houses, and only fit for shops. He had received many complaints from the customers.

Other cases were gone into, after which Mr. INGHAM remanded the prisoners for another week. Hoyland was admitted to bail.

Miscellaneous News.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly General Meeting of Shareholders was held at the London Tavern on Monday, April 5—THOMAS BRIDGE SIMPSON, Esq., in the chair.

The SECRETARY (Mr. G. Livesey) read the notice convening the meeting, the minutes of the last meeting, and the following report of the directors, to which the accounts are appended:—

The report which the directors have to present to you will, they believe, meet your approval.

By comparing the accounts with those for the corresponding half year of 1873, it will be seen that the price of coal has fallen considerably, though it is still greatly in advance of the old rates, while coke has been sold at prices very little exceeding those obtained in the days of cheap coal. Tar has, however, risen in value, and the demand for gas has very largely increased.

This increase of business necessitates constant additions to the works and mains of the company, the proceeds of the calls made from time to time on the new shares being expended on these objects. The principal work now in hand is a new gasholder-tank for the reception of a gasholder to contain upwards of 2 million feet of gas, which, it is hoped, will be ready for use before next winter.

The proposed legislation, initiated by the Corporation of London, and the Metropolitan Board of Works in reference to the gas supply of the metropolis, would have seriously affected the property of this company. Two bills were brought forward—the first for the construction of entirely new works, and the second for the purchase of the interests of the gas companies; both, however, were withdrawn before the second reading. The directors were prepared to offer vigorous opposition to these bills—against the purchase bill, on the ground that the terms proposed were totally inadequate, and very far below the intrinsic value of this company's property.

The proprietors are aware that the charge for gas continues to be much below the maximum of 3s. 6d. per 1000 feet as fixed by the Act of 1869. This appears to the directors to give a value to the works and goodwill of the company, which should not be lost sight of if at any future time it should be again proposed to purchase the undertaking.

A third bill has been introduced into Parliament as a public measure for the purpose of bringing the whole of the metropolitan gas companies under one uniform system of regulation, in which some of the clauses are of a more stringent character than those imposed by the Acts of 1868 and 1869. The directors will narrowly watch the progress of this bill, and oppose any undue stringency. This company have honestly carried out the stipulations of these Acts, and as the public authorities and the private consumers of their district are satisfied, there appears to be no necessity for further legislation.

A reference to the net revenue account No. 4 will show that the balance available for dividend, including £6080 11s. 3d. brought forward from the last account, is £23,231 17s. 6d., of which £18,250 will be required for the usual dividend, leaving £4981 17s. 6d. to carry forward to the next half year in addition to the reserve-fund, which still remains intact.

By the company's Act of Incorporation, one director retires from office at this meeting, and also one auditor.

Wm. Baker, Esq., as director, and A. F. Paull, Esq., as auditor, will, therefore, retire; but these gentlemen, being eligible, offer themselves for re-election.

No. 1.—STATEMENT OF SHARE CAPITAL *on Dec.* 31, 1874.

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount not paid up.	Total Amount authorized.
5 Vict., cap. 79	Share.	10 per cent.	4,000	£50 0 0	£50 0 0	£200,000 0 0	..	£200,000 0 0
			4,000	12 10 0	12 10 0	50,000 0 0	..	50,000 0 0
& 33 Vict., cap. 130	Do.	Do.	20,000	12 10 0	6 10 0	130,000 0 0	£115,249 0 0	250,000 0 0
					Anticipation calls.	4,751 0 0	..	..
						£384,751 0 0	£115,249 0 0	£500,000 0 0

No. 2.—CAPITAL ACCOUNT.

To Expenditure to June 30, 1874	..	£337,092 13 9	
,, during half year to Dec. 31, 1874—viz.,			
New buildings and machinery in extension of works	£14,314 2 0		
New and additional mains and services	5,244 1 5		
New and additional meters	913 4 4		
		20,451 7 9	
Total expenditure		£357,544 1 6	
Balance		27,206 18 6	
		£384,751 0 0	

Description of Capital.	Certified to June 30, 1874.	Received since that Date.	Total to Dec. 31, 1874.
By Shares, at £50 each	£200,000 0 0	..	£200,000 0 0
Do., at £12 10s. each	50,000 0 0	..	50,000 0 0
Do., at £12 10s. each, £6 10s. paid	100,000 0 0	£30,000 0 0	134,751 0 0
Amount received in anticipation of calls	..	4,751 0 0	..
	£350,000 0 0	£34,751 0 0	£384,751 0 0

No. 3.—REVENUE ACCOUNT.

To Manufacture of gas—			By Sale of gas—		
Coals, including dues, carriage, unloading and trimming. (See Account No. 7.)	£40,873 17 2		Common gas (per meter) at 3s. per 1000 cubic feet	£51,406 13 8	
Purification, including £557 2s. for labour	1,017 6 9		Less discount	97 5 2	
Salaries of engineer, superintendent, and officers at works	577 4 0			£51,309 8 6	
Wages (carbonizing)	8,874 10 3		Public lighting and under contracts (see statement No. 9)	6,748 15 5	
Repairs and maintenance of works and plant, materials, and labour—less £164 7s. 3d. received for old materials	2,585 17 11				£58,058 3 11
Distribution of gas—		£53,928 16 1	Residual products—		
Repair, maintenance, and renewal of mains and service-pipes, including labour	£2,936 11 2		Coke, less £888 17s. 7d. for labour and cartage	£16,448 16 10	
Salaries and wages of officers (including rental clerks)	1,400 8 8		Breeze, less £7 16s. 6d. for labour and cartage	492 14 11	
Repairing and renewals of meters	972 2 2		Tar	4,777 6 4	
Public lamps—		5,309 2 0	Ammoniacal liquor	2,977 17 2	
Lighting and repairing		1,386 19 3			24,696 15 3
Rents, rates, and taxes—			Rents receivable		148 10 6
Rents payable	£280 6 4		Transfer fees		0 17 6
Rates and taxes	1,877 3 4				
		2,157 9 8			
Management—					
Directors allowance	£595 0 0				
Salaries of secretary and clerks	700 0 0				
Collectors commission	594 3 7				
Stationery and printing	152 10 7				
General charges	538 11 5				
Company's auditors	49 11 8				
		2,629 17 3			
Law and parliamentary charges		40 7 10			
Bad debts		238 0 5			
Superannuation-fund		254 12 0			
Gas referees and official auditor		84 10 8			
Total expenditure		£66,029 15 2			
Balance carried to net revenue account, No. 4		16,874 12 0			
		£82,904 7 2	Total receipts		£82,904 7 2

No. 4.—PROFIT AND LOSS (NET REVENUE ACCOUNT).

To Interest on temporary loans		£64 18 8	By Balance from last account	£23,579 1 3
,, deposits		24 15 8	*Less* dividend on ordinary capital for the half year ending June 30, 1874	17,498 10 0
				£6,080 11 3
Balance applicable to dividend on ordinary share capital		23,231 17 6	By Amount from revenue account, No. 3	16,874 12 0
			Interest on moneys on deposit	46 19 5
			Dividend on reserve-fund	319 9 2
		£23,321 11 10		£23,321 11 10

No. 5.—RESERVE-FUND.

To Balance on Dec. 31, 1874		£20,000 0 0	By Balance on June 30, 1874	£20,000 0

No. 6.—RENEWAL-FUND (LEASEHOLD).

To Balance on Dec. 31, 1874		£9,307 11 9	By Balance on June 30, 1874	£9,160 14 10
			Interest on amount invested	146 16 11
		£9,307 11 9		£9,307 11 9

No. 7.—STATEMENT OF COALS.

Description of Coal.	In Store, June 30, 1874.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, Dec. 31, 1874.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal	6,393	44,939	43,604	241	7,487
Cannel coal	2,847	..	274	..	2,573
	9,240	44,939	43,878	241	10,060

No. 8.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, June 30, 1874.	Made during the Half Year (estimated).	Used in the Half Year. (estimated).	Sold in the Half Year.	In Store, Dec. 31, 1874.
Coke . . . . . Chaldron of 36 bushels	65	43,787	13,443	28,799	1,610
Breeze . . . . . do. 36 do.	189	2,782	200	2,328	443
Tar . . . . . Gallons	17,270	415,122	1,000	421,892	9,500
Ammoniacal liquor Bts., 108 gall. 10-oz. stgth.	544	9,695	..	7,225	3,014

No. 9.—STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity made, partly measured in Gasholders.	Quantity Sold.			Quantity used on Works, &c., partly estimated.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	418,963	37,863	342,711	380,574	4,000	384,574	34,389	3,606

No. 10.—BALANCE-SHEET.

To Capital—				By Cash at bankers		£3,217 18 7
For balance, per account No. 2	£27,206 18 6			Amount invested in Three per Cent. Consols—		
Reserve-fund, per account No. 5	20,000 0 0			Reserve-fund.	£20,000 0 0	
Renewal-fund, per account No. 6	9,307 11 9			Renewal-fund	9,307 11 9	
Net revenue account, for balance, per account No. 4	23,231 17 6					29,307 11 9
Sundry tradesmen, for amount due for coals, stores, and sundries. .	4,418 7 3			Cash in hand for freight, accounts, &c.		1,000 0 0
Deposits by consumers	3,004 2 5			Stores in hand—		
Property-tax account	269 18 0			Coals	£13,148 6 11	
Dividend account (outstanding)	219 6 7			Coke and breeze	1,047 15 0	
Temporary loan	5,000 0 0			Tar and ammoniacal liquor	1,113 10 5	
				Sundry stores	2,366 9 5	
						17,676 1 9
				Accounts due to the company—		
				Gas-rental, quarter ending Dec. 31, 1874 . . .	£38,296 17 10	
				Arrears outstanding	331 11 11	
						38,628 9 9
				For coke and other residual products		2,108 15 9
				Sundries		399 15 3
				Interest		319 0 2
	£92,658 2 0					£92,658 2 0

I certify that the above accounts are correct.

March 12, 1875. (Signed) CHARLES H. PARKES, Official Auditor.

The CHAIRMAN: Gentlemen, it is now my duty to propose that the report be received and entered on the minutes. In doing so, allow me to assure you that the directors have great pleasure in meeting the shareholders here to-day, and for this reason. It is always one of our most agreeable duties to attend these meetings, because we invariably receive from you that courtesy and consideration which, to a board of directors, is the most gratifying proof that their labours are appreciated. We believe that the expressions of your approval are heartily, cordially, and sincerely rendered, and, therefore, I say it is always an agreeable duty to meet you on these occasions. I have no doubt I could interest and amuse you with statistics respecting the company, as to the consumption of coal, and so on; but probably it would take up too much of your time. I shall, therefore, not trouble you with them. Those statistics are very fully laid before you in the accounts, and perhaps you will better comprehend them from a perusal of this document than you would if I were to make them a part of my speech. You will observe by our report that two of the bills in Parliament, relating to the gas supply of the metropolis, which had been promoted by the Board of Works and the corporation, have been withdrawn. One of them was for the purchase of the undertakings of the gas companies at a most inadequate price, and therefore it was a measure we should very strenuously have opposed. I do not know that we or any other company object to the public authorities becoming their own manufacturers of gas, provided they gave us a fair price for the property they would require to take from us. We have no very special desire to retain it, but we do not intend to be deprived of it unfairly. But the authorities have introduced another bill into Parliament, which we also think is very objectionable. I do not wish to cast any odium on those who introduced it, but I say distinctly that some of the clauses are such as we must strongly oppose. We are, by existing legislation, subject to the control of a public auditor, and we make no objection to that. This officer examines our accounts and books, and I believe he is perfectly satisfied with the treatment he receives from the company, and that the public are satisfied with the results of his investigations. But the bill to which I now refer provides, that, not only shall the board have their own officer to look after ours, but that there is to be an auditor to look after him, and to make objections, if he thinks proper, to allowances which the existing auditors may have made. Well now, gentlemen, with regard to our own company, I may say that we expect that we shall have to make a call upon you about next October. We shall want about 30s. or £2 a share, and in stating that I trust you will not think we are squandering your money. You may rely upon it we are making the best use of it we can, and we will not call it up until we see clearly our way to make a proper use of it, and to earn a dividend for you upon it. I do not know that there is any information I can give you respecting the affairs of the company beyond what is in the report, but if any shareholder desires to ask questions upon them, I shall be most happy to answer him, and to give him any explanations that may be necessary.

Mr. F. SIMPSON seconded the motion.

Mr. PRALL: There is only one thing in the accounts that I wish to make a remark upon. It is an item in the capital account—"Amount received in anticipation of calls, £4751." I am sure we have such confidence in our directors, and in the way they use our money, that we should like to pay up our calls at once. I should like to know whether we can anticipate the payments yet due upon them?

The CHAIRMAN: I am very glad to feel sure that you think we shall not waste your money. This amount is for calls paid by shareholders in advance, upon which, however, they got no benefit or interest from until the calls came due.

The SECRETARY: The money was paid a few days before the end of last year into the hands of the bankers, in anticipation of the call due on the 1st of January. We were obliged to show it in this account, or our bankers books would not have agreed with ours.

Mr. ROSTRON: I am glad to see that the company are gradually improving their position. I find that the difference this half year between the actual profit of the working and the amount required to pay the dividends is only £1376, as against £5968 on the last occasion.

The SECRETARY: The profit is really rather more than that, for there is the interest on the reserve-fund to be added.

Mr. ROSTRON: I think it is extremely satisfactory to find that we are making both ends meet.

The CHAIRMAN: Yes; within £1100.

Mr. ROSTRON: In the second paragraph of the report, we are told that the demand for gas is increasing, and no doubt the directors are warranted in making that statement. Looking at the accounts, it appears that this statement is not borne out, but no doubt Mr. Livesey will be able to explain it.

The SECRETARY: In the first place, I would say to Mr. Rostron that it is not fair to compare the December half year with the June half year. The comparison should be with corresponding half years; and if such a comparison is made, it will be found that the company's business is largely increased. As to the unaccounted-for gas, you should know that a certain amount comes into charge in the first half year for gas sent out at the end of the previous year; in fact, there is more gas comes into charge in the June half year than is really due to that period, and less in the December half year. But, taking the two together, you will find the unaccounted-for gas comes to about 6 per cent. It has stood at between 6 and 7 per cent. for the last five years.

Mr. GRAY, in a speech of some length, traced the history and progress of past gas agitations in the metropolis, and strongly censured the Metropolitan Board and the corporation for the steps taken by them in reference to the bills of the present session. There was, in his opinion, no justification for the promotion of the bills already withdrawn, and he sincerely hoped the authorities would be defeated in their remaining attempt to depreciate the value of gas property.

The motion for the adoption of the report was put and carried unanimously, and, on the motion of the CHAIRMAN, it was resolved—"That a dividend at the rate of 10 per cent. per annum be now declared and made payable on the 8th inst., and that the warrants be transmitted to the proprietors by post."

Mr. PRALL, in moving the re-election of Mr. Baker, a retiring director, said, although he had not the pleasure of a personal acquaintance with that gentleman, he felt confidence in recommending his reappointment to the meeting, after the experience the shareholders had had of the wise and careful management by the board of which he had formed a member. Referring to the bills introduced by the Metropolitan Board, he said that, while recognizing the fact that individual interests must often suffer when they were inconsistent with the general good of the community, he felt that the shareholders of gas companies had reason to complain of threatened legislation, which, while injurious to private enterprise, could produce no advantage to the public. In the present instance, as regarded this company certainly, there was no complaint on the part of the consumers of gas, and yet the company were put to expense and trouble in defending themselves against a measure which, if adopted, would be very prejudicial to them.

The motion having been carried,

Mr. BAKER acknowledged the vote, and promised that his best attention should be given to the promotion of the interests of the company.

On the motion of Mr. WALLINGTON, the retiring officer, Mr. Paull was re-elected.

Mr. PAULL said he was much obliged for the compliment thus paid to him. He had served in that capacity for several years, and he had always received the most valuable assistance in the performance of his duties from the secretary of the company. The accounts were admirably kept, and he believed the interests of the shareholders could not be in abler hands.

On the motion of Mr. GRAY, seconded by Mr. PRIDDEN, a cordial vote of thanks was given to the chairman and directors for the able manner in which the affairs of the company had been conducted in the past six months.

The CHAIRMAN: Gentlemen, we have much pleasure in receiving and acknowledging this mark of your approval. I assure you that we do honestly and sincerely endeavour to do our best for the benefit of the proprietors, and to serve the public. There was one remark I made on the last occasion which I may again allude to. People talk sometimes as though gas was of as much importance to them as bread. What are the facts as regards this company. We have many customers who take gas from us, and who pay us less than £1 a year. I think we have nearly a thousand customers who pay less than that amount annually. And, recollect, we have to collect this sum in four payments. Then we have about 6000 customers whose accounts are under £5 a year each. You can well understand that, with this large number of small accounts, we have a great deal of trouble in the collection. And then, with reference to the bills continually being brought into Parliament affecting gas companies, we have to watch them, and to defend your interests against any attack that may be made upon them; and this, too, is attended with much labour and an enormous expense. The public are really injured also by these proceedings, because we are spending money which would come to them, after the payment of our 10 per cent., and spending it in waste. I will only say, in conclusion, that my brother directors appreciate with me the compliment you have just paid us, and I can promise for them, as well as for myself, that so long as we have the conduct of your affairs, we shall conscientiously attend to the business of the company.

Mr. GRAY: We all know that no concern can be prosperous without able management, and we have in our worthy friend, Mr. Livesey, the engineer and secretary, a man who is thoroughly up to the mark, who is most conciliatory

in his conduct, and who conscientiously discharges every duty that comes before him. I have, therefore, much pleasure in proposing a vote of thanks to him, for I am sure no man is more deserving of it.

The motion having been carried unanimously,

The SECRETARY said: Gentlemen, I am very much obliged to you for this hearty vote, and I thank Mr. Gray sincerely for the terms in which he proposed it. I have seen this company grow from a very small concern indeed to its present magnitude, and I believe it will continue to give satisfaction to the public as it has in the past. I may say that I hear on all sides that, as far as this company are concerned, the consumers of gas and the public authorities are satisfied.

PHŒNIX GASLIGHT AND COKE COMPANY.

The Adjourned Half-Yearly General Meeting was held at the Bridge House Hotel, Southwark, on Wednesday, the 7th inst.—EDWARD HORNER, Esq., in the chair.

The SECRETARY (Mr. I. A. Crookenden) read the notice convening the meeting, the seal was affixed to the register, and the minutes were read and approved.

The following report and accounts were presented:—

In November last the directors received a communication from the President of the Board of Trade suggesting that it would be beneficial that an amalgamation of the metropolitan gas companies should be arranged, and accordingly your directors gave the usual parliamentary notices to enable them to obtain a permissive bill to amalgamate with all, or any, of the gas companies south of the Thames. The bill, however, having been adjudged not to have complied with the Standing Orders, cannot be proceeded with.

The Metropolitan Board of Works, in combination with the Corporation of the City of London, introduced two bills into Parliament, one to erect gas-works to compete with the metropolitan gas companies, the other for the compulsory purchase of the gas companies at the average price of their shares for three years previous to Oct. 1, 1874. Both these bills have been withdrawn, and the Metropolitan Board of Works have since introduced a third bill, its object being to amend the Metropolis Gas Act, 1860, and which, containing provisions highly detrimental to the interests of this company, will be met with the most strenuous opposition.

The consumption of gas continuing to increase, a contract has been made for the erection of a gasholder, to fill the tank constructed at Kennington in October, 1873.

The price of gas was reduced to 4s. 2d. on the 1st of July last, and notice has been given to reduce it to 4s. on the 1st of April, notwithstanding that coals are still at least 30 per cent. higher than in 1872.

The accompanying accounts show that the net profit for the half year ended Dec. 31, 1874, is £39,449 11s. 10d., and your directors recommend that dividends be declared as follow:—

On the £20 divided shares, 10 per cent. per annum	£27,000
On the £20 new stock, 7½ per cent. per annum	7,425
On the £20 capitalized stock, 5 per cent. per annum	3,600
Total	£38,025

And that the balance, £1424 11s. 10d., be carried to the reserve-fund.

ABSTRACT OF THE TRADE ACCOUNT, *for Six Months ending Dec.* 31, 1874.

Dr.				*Cr.*			
To Coals used	£75,639	3	2	By Rental	£138,401	17	6
Materials supplied	17,385	2	9	Coke	27,194	8	3
Meters—repairs and renewals	1,988	1	3	Breeze	748	6	1
Rates	4,356	11	0	Tar	2,963	6	10
Directors, £1000; auditors, £50	1,050	0	0	Ammonia	2,767	5	3
Salaries and commission on collection	5,690	12	10	Rents	1,401	13	0
Pensions	610	0	0	Miscellaneous receipts	566	8	6
Wages	21,872	12	0	Interest	25	1	1
Bad debts and allowances	358	9	10				
Interest on bonds	3,852	12	1				
Leasehold-fund	430	0	0				
Rents	480	0	10				
Interest	259	12	1				
Insurance	160	1	0				
Law	485	15	10				
Net profit	39,449	11	10				
	£174,068	6	6		£174,068	6	6

ABSTRACT OF THE BALANCE-SHEET, *Dec.* 31, 1874.

To Capital of 27,000 £20 shares, paid in full (maximum dividend 10 per cent.)	£540,000	0	0	By Amount of plant on June 30 last	£943,962	9	0
Capitalized stock, paid in full (maximum dividend 5 per cent.)	144,000	0	0	Expended this half year for extension of works	1,927	15	4
New stock, £360,000, £55 per cent. paid up (maximum dividend 7½ per cent.)	198,000	0	0		£945,890	4	4
Bonds, at 5 per cent.	175,000	0	0	Investment of leasehold-fund	20,726	19	11
Unpaid dividends	119	4	3	Reserve-fund	47,107	19	9
Unpaid tradesmen's bills, &c.	23,141	8	1	Amount due for rental—			
Leasehold-fund	20,726	19	11	Christmas quarter £92,388 18 0			
Reserve-fund	47,107	19	9	Arrears 146 9 9			
Half year's profit	39,449	11	10		92,535	7	9
				Amount due for coke, breeze, tar, and ammonia £16,263 9 6			
				Ditto sundries 2,455 13 9			
					18,724	3	3
				Stock of coals £7,720 5 10			
				Ditto coke 953 10 0			
				Ditto breeze 135 0 0			
				Ditto tar 327 4 3			
				Ditto ammonia 308 8 6			
				Ditto retorts 625 2 11			
				Ditto pipes 1,448 15 0			
					11,518	6	6
				Meters	43,164	5	11
				Balance at treasurer's	7,877	16	5
	£1,187,545	3	10		£1,187,545	3	10

The CHAIRMAN: Gentlemen, in moving that the report be received and entered on the minutes, I would remark that I think the accounts are tolerably satisfactory, considering that coals remain at such a very high rate compared with what they were in former years. During the six months ending in Dec. last, we paid 21s. a ton for coals as against 14s., which was the price before the great advance took place. It will be seen that we paid less in total amount for coals last half year by £12,164, than in the half year ending June, 1874, and £12,054 less than in the half year ending June, 1873. But, unfortunately, on the other side of the account you will see that our receipts for coke were also very much less; indeed, they amounted to £5196 less than in June, 1874, and to £16,779 less than in Dec., 1873, all of which goes to show that the cost of gas does immensely depend upon what we can get for our coke. Any calculation that can possibly be made as to having a price commensurate with the cost of coal appears to be absolutely impossible, for there is not one of the companies but has suffered in the same way. In the Chartered Company, with the most extraordinary exertions to sell their coke, they have met with the most wretched results, for they received only £54,000 for the immense quantity they had to sell. Still I think it is a matter for congratulation that, notwithstanding all these difficulties, we have been enabled to reduce the price of gas from 4s. 6d. to 4s. 2d., and it is a proof that our calculations were not much amiss when you see that we have made our dividend, though but "by the skin of our teeth," inasmuch as we only carry over some £1200 or £1400 to the reserve-fund. It shows, however, as I said, that we did not calculate very much amiss when we reduced our price 4d., which is equivalent to no less than £10,000 or £12,000 off the receipts. So far, then, the accounts are satisfactory. Also, I think that our officers may be in some measure praised for the result. We have during the half year sold, and received for, 9154 cubic feet of gas per ton of coal carbonized, which is a result far in excess of anything we have attained before. On previous occasions we thought we had done very well when we received for a little under 9000 feet; we are now above that, which shows that our pipes and mains are in good order, and that no gas is left in the coals—that the engineers do manage their matters so well that they get out of it all that was in it. Being so much looked after by the public, it is something to say that we are thus doing as much as possible in their interest and in our own. On the last occasion I gave you some little account as to what would have been our position supposing that coals had remained at the price they were at before the enormous advance, and if we were now receiving the same money for coke we were then. I find that if we had recently been paying 14s. 2d. per ton, which was the highest price we formerly paid for coals, and that if we had sold our coke at only 7s. 10d., which was a very low price at that period, we should at the present moment be able to supply the public with gas at 3s. 4d. per 1000, and even then to realize, beyond our dividends, a small profit of something like £700 or £800 to carry over to our reserve-fund. I mention this because the prevailing idea is that the cost of coals has nothing whatever to do with the price of gas. This is not an estimate, but the real figures of the results for the past half year, and any person having our accounts before him can ascertain the facts for himself, and he will find them to be as I say. I believe that, but for the extraordinary rise in coals, the directors had contemplated just previously a reduction in the price of gas to 3s. 9d. per 1000 cubic feet. I am happy to say that there is now a gradual fall in the price of coal taking place; there will no doubt be still further reductions. At the present time we are supplying gas at 4s., and I hope it is possible that, by the June quarter, such an amelioration may have taken place in the coal market as to enable us to revert to our old price of 3s. 9d. We do not pledge ourselves to that, but I think it is a thing quite on the cards. As to our accounts, as now presented, I do not know that they call for any particular remark. Of course, every shareholder must have observed what is going on in the House of Commons and in the Metropolitan Board of Works with respect to the London gas companies. It is not my intention to offer any sort of tirade against the Metropolitan Board or the Corporation of London for the steps they are taking in this matter, but still there are a few facts which, I think, should be brought before you. These two bodies originally brought in two bills this year, one to purchase the undertakings of the gas companies, and the other to erect competing works. They have since introduced a third bill, the object of which is to regulate the companies. The bills for purchasing the existing works and for erecting new works have been withdrawn, and I cannot but think the Metropolitan Board and the corporation exercised a wise discretion in taking that step. Competition was evidently an impossibility, and I can only wonder that these bodies were so misled by some of their own members, ever to have thought of such a thing. The question has been settled many times, that it is the most effectual way for making dear, and not cheap gas, and any fresh proposal of the kind had not the smallest chance of success. By the second bill under which these bodies sought for power to purchase works, it was proposed to do by Act of Parliament what never yet has been done in commerce—that is, that in dealing, one party shall be both buyer and seller. The Metropolitan Board were to be the purchasers of the companies, and they themselves named the price in the bill at which they were to buy our undertakings. I have had a great deal to do with business in my life, and this was certainly the first time that I ever heard such a principle enunciated. And then the price which the board named was such that the shareholders who are now receiving 10 per cent. would have been mulcted of 30 per cent. of their dividends. No doubt this would have been a very capital business for the board. I only wish I could do business on the same terms. But the most extraordinary thing was that, supposing the purchase to be effected, the Metropolitan Board did not mean to fetter themselves in their dealings with the public by any of the conditions with which they propose to fetter the gas companies. They were to have no limitation in respect to anything. In their hands, the amount of sulphur in the gas was immaterial, the amount of ammonia was immaterial, and when, on the discussion of the bill, one member of the board reminded the chairman of the committee that the price at which gas should be supplied had been left out, Mr. Richardson replied, "The board, being able to borrow money cheaper than the companies can raise it, would be able to make gas cheaper but there is ample reason why we should not put a price in the bill. On the one hand it is quite clear that we may make it cheaper, but it is quite possible that contingencies may arise that will make it necessary for the board to charge more than 4s. 6d." Now, gentlemen, what do you really think of a board who can come down with such a proposition as that? However, I need say nothing more on the subject, for the bill is withdrawn, and there is an end of it. I can only express my surprise that they should have brought themselves at any time to believe that they could carry a bill under which they would be entirely

released from any of the restrictions and limitations which they are so eager and ready to thrust upon us. I believe their real object in bringing in the bill was to endeavour to get money to spend in the metropolis. They were to have a reserve-fund, a certain portion of which was to be applicable to the metropolitan purposes. I wonder what would be said to us if we proposed to take a part of our profits for other than their prescribed object. It is not every one, you know, who is a consumer of gas, and this bill would have taxed the consumers by keeping up the price of gas, because the board require money for other purposes. The only bill now before the House is the Regulations Bill, and that is a bill to confiscate our dividends, which it is attempted to do by fixing a low maximum price of gas, and providing that for every penny we are obliged from circumstances to charge beyond that rate, we shall lose a quarter per cent. of dividend. First of all they fix 3s. 9d., which is very nearly an impossible price, with the illuminating power prescribed—viz., 16 candles—not 16 candles on the average, but as the minimum, the consequence being that the gas will cost a vast deal more than appears at first sight. What would the effect of this be? Who is to control the price of coals? Why, Mr. Richardson himself says that it would not do for the board, if they undertook to supply gas, to limit themselves even to 4s. 6d. The board by this bill are asking Parliament to do what they have never done before. Parliament have granted Acts, on the faith of which the companies have raised certain capitals, upon which they are entitled to certain dividends, also prescribed by the Legislature, and there never has been an instance yet of Parliament tampering with the principles under which they have sanctioned such proceedings. If in this case they should accede to the request of the Metropolitan Board and pass their bill, then every joint-stock interest in the country may look out, for if this policy is applied to gas companies, there is no telling how soon it may be extended to every other business undertaking carried on with capital raised under legislative sanction. My only astonishment is that the Metropolitan Board could have got a gentleman like Sir James Hogg, to pledge himself to bring in such a bill. The House of Commons are very jealous of their privileges, and this is an attempt to infringe upon a principle which has never yet been violated, and to accomplish an object not asked for by any one except a few vestrymen. We, the gas companies, have no objections to proper regulations, but we do protest against this underhand attempt to depreciate our property. No doubt it is done with an object. Luckily we know by the papers what is done at the Board of Works, and we find Mr. Newton there making this observation, "I believe this, if these regulations are passed, imposing upon the companies a reduction of their dividends if the price of gas should be beyond 3s. 9d., it will prevent the shares going to that inordinate value they have attained during the past few months since the question was before the public, as placed there by the board; and, in fact, if so, we shall be in as good a position next year or the year after, if the Government should favour the board's operations in carrying out a system of supply." What is the meaning of that? Simply this: "Let us get an Act which will depreciate the value of the companies property, and then we can buy it at a less price than we could do now." That is my translation of it, at all events, and I believe it is the true one. I hope that if any shareholders present have influence with members of the House of Commons, they will do the best they can to put the matter clearly before them, and show that the House would be doing themselves an enormous injustice if they allow such a bill as this to go into committee at all. I say nothing about the "regulations." I speak only of the principles sought to be established by the bill, and I say they are such as Parliament were never before asked to consent to. There is only one other point I need refer to. I think the vestrymen in our district have not acted quite as conscientiously to this company as they should have done. During the whole of the time in which the high price of coals has prevailed, we have not interfered with or raised the charge for the supply of gas to the public lamps. We were in hope—as it has proved at last—that the price of coals would be reduced, and we were therefore not willing to tax the vestries by demanding a higher price for the public lamps while it lasted. Now I see, from a report made to the Commissioners of Sewers, that no less than £6. 9s. 6d. per lamp per annum has been charged by the Chartered Company during the past year; whereas the average charge made by this company over the whole of their area, including the country district, was under £4 12s. If we had charged the same price as the Chartered Company did, it would have made a difference to us of £10,800, and we should have been enabled to reduce the price of gas to private consumers in that proportion. I must say, therefore, that I think the vestries have treated us very unfairly in their opposition. We have lighted them at a price which, in justice, perhaps, to our private consumers, we should not have done, because we should not have had to raise their price to 4s. 6d., and we have gained no good by it ourselves. However, it is a lesson for us. It is only another instance, among many, in which people are willing to take everything, and are prepared to give nothing. We are looked upon almost as public robbers, whereas I say that having regard to the fact that companies on the other side of the water have been charging about £2 per lamp more than we have done, they were bound to give us some little credit for the liberality with which we have dealt with them. I beg now to move the adoption of the report.

Mr. SHAND (deputy-chairman) seconded the motion.

Mr. LEGG: I should like to know the meaning of the item in the accounts, "Interest, £259," and whether the £485 for law costs includes the parliamentary business.

The CHAIRMAN: The item "interest" is partly for the interest we have paid for occasional accommodation at our bankers, and a considerable portion is for interest we pay on deposits. We have been in the habit of paying 5 per cent. upon money deposited by consumers. The item "Law," includes every expense of the kind, except the costs attending the introduction of our bill into Parliament for amalgamation. The secretary tells me that the £485 extends over nearly a year and a half. I think, if you refer to our last accounts, you will find no item for "Law" there.

Mr. LEGG: I merely asked the question, thinking that, perhaps, the Metropolitan Board had put you to considerable expenses.

The CHAIRMAN: That has to come.

Mr. LEGG: I, for one, am rather sorry you did not say something about the regulations in the bill which the board are promoting. Leaving out altogether the proposal to diminish the dividends, I think many of the regulations are extremely unwise, and that, if passed, they would almost take the control of our business out of the hands of the directors. They would have to do whatever the referees tell them—what works they may put up—as to how they are to manage their affairs and to manufacture their gas.

The CHAIRMAN: I did not think it necessary to go into the whole of that, but rather to refer to the general principle of confiscation which the bill sanctions. We have no idea that these regulations will ever pass; no committee would sanction them. I might say that it would be perfectly impossible to pay the fines the board would have power to impose upon us, no less than £250 a day, to say nothing of a fine of £50 for something else.

Mr. LEGG: As you are going to fight these clauses, perhaps I had better say nothing about them. I hold that the Metropolitan Board, in promoting these bills, have no right whatever to bring the money of the ratepayers into competition with private enterprise. Although I congratulate this company upon the withdrawal of the New Works Bill of the board, I do not know that I ought to congratulate them upon the withdrawal of the Purchase Bill. I am sure that Parliament would never have sanctioned the purchase of our shares at their average price in the market during the past three years, nor would they have compelled the shareholders to take metropolitan stock in payment for them. But I do believe this, that if the Purchase Bill had gone before the House of Commons, there is a sufficient sense of justice in the members to require that, if the undertakings of the companies were purchased, they should be purchased at their true value, and if that were done, I think the proprietors would be much better off than in having to wage continual war with the corporation and the Metropolitan Board. The chairman has complained that the vestries on this side of the water have not been just to the company. I think it ought to have been brought more prominently before them and before the public that the company were charging considerably less for the lamps in the street than many other companies, and that thus the ratepayers were being remunerated for the extra expense they were paying for the gas they privately consumed. I do not think the consumers on this side of the water have much to complain of as to the price of gas, and I do not know that they have done so; for I have never seen any resolutions of the vestries on the subject.

The CHAIRMAN: The Lambeth Vestry have taken part in the agitation.

Mr. LEGG: We know pretty well how that is done. A little agitation is sometimes got up in order that people may keep their places. I believe it was not so in this instance, and that the feeling of the majority of the ratepayers is not unfavourable to the company.

The CHAIRMAN: In my remarks I tried to steer clear of any details. We feel perfectly sure that if that part of the bill was refused by the House, all the rest must fall through altogether; because the great object of the board is to prevent us from charging a higher price for gas than 3s. 9d., whatever the cost of coal may be. Many of the regulations are so monstrous that it never entered into my head that any committee of the House of Commons would sanction them. The bill was to have been read a second time last night, but it has been postponed. I hope, even yet, the board may see that they are not acting quite justly to the companies, and will come to the conclusion not to proceed with it. From what I have heard, the Corporation of the City of London are not much in love with their position. They feel that they are being rather dragged along in a course which is endangering vested interests, and of all bodies in the world the corporation are usually most jealous of them. I cannot understand how they could have entered into such a thing, seeing that when their own vested interests are likely to be attacked, they are always ready to cry out loudly about it. It is, therefore, a matter of surprise to many persons that they should take the course they have done. I can only again urge upon shareholders to bring what influence they can to bear upon their representatives in Parliament, to induce them to attend and vote against the principle of confiscation which this bill involves. We have a great interest at stake, and it is worth while to put our shoulders to the wheel, and do all we can to protect our property.

The motion for the adoption of the report was put and carried.

Mr. SHAND moved—"That dividends for the half year ending December 31st last be and the same are hereby declared and made out of the profits of the undertaking, at the following rates:—On the £20 divided shares, at the rate of 10 per cent.; on the amount paid up on the new stock, at the rate of 7½ per cent.; and on the capitalized stock, at the rate of 5 per cent. per annum, less income-tax in each case, such dividends to be payable to the bankers of the proprietors so ordering it, and the remaining dividends to be forwarded by post."

Mr. HARRIS seconded the motion.

The CHAIRMAN stated that, in consequence of some remarks made at the last meeting, the directors had arranged to pay the dividends considerably earlier than usual. The warrants would be forwarded on Monday, the 12th inst.

The motion was put, and carried unanimously.

The chairman having vacated the chair, Mr. Hobson was called upon to preside during the election of the board.

Mr. LEGG referred to the great labour devolving upon the chairman of a company like this, more especially during a period when proceedings in Parliament, affecting so seriously the interests of the shareholders, were being taken, which required constant watching. He asked whether it would be in order for him to propose a resolution voting a certain additional remuneration to the chairman for his services.

The SECRETARY (being appealed to by Mr. Hobson) said the question was entirely in the hands of a general meeting like this to vote what sum of money they thought right to the directors.

The CHAIRMAN (*pro tem.*) said he believed the practice hitherto had been to vote a lump sum to the directors, leaving the distribution of it in their discretion.

Mr. YOUNG, M.P., said he would supplement Mr. Legg's remarks by adding that, to his certain knowledge, a great deal of labour, anxiety, and trouble devolved upon the chairman in connexion with parliamentary matters, and the shareholders owed him a debt of gratitude for his services.

Mr. W. B. JAMES, as a director of another company, testified to the additional labour cast upon the boards. He was well aware that the chairman of the Phœnix Company had been of great service to the shareholders, but, as far as the meeting was concerned, he thought it better to vote a certain amount to the directors, leaving it to them to apportion it as they thought right.

Mr. LEGG accordingly moved a resolution increasing the allowance of the board from £2000 to £2500 a year.

Mr. W. B. JAMES seconded the motion.

A SHAREHOLDER said he thought, under present circumstances, it would be better not to pass such a resolution. The expenditure of gas companies was very narrowly watched, and this vote, if carried, would put it into the mouths of their opponents to say they had so much money they did not know what to do with it.

The motion was put, and carried with three dissentients.

Mr. HORNER said he was much obliged to Mr. Legg for having brought the matter forward, his intention to do so being previously quite unknown to the directors. No doubt there was a great deal more work to do than most people were aware of, but the directors had been quite content with the remuneration they received. They, however, were grateful to the shareholders for this additional proof of appreciation of their services, and, as far as he was personally concerned, he would only add that the board took good care of their chairman.

The retiring directors and auditors were severally re-elected, Mr. Horner being again appointed chairman, and Mr. Shand deputy-chairman of the company. A vote of thanks was also given to the board for their services.

The CHAIRMAN acknowledged the vote, and having done so, moved that the thanks of the meeting be given to the secretary, engineer, and staff of the company generally for their exertions during the past half year.

The vote was carried unanimously.

The ENGINEER (Mr. C. Woodall) acknowledged the compliment. He said it was a very pleasant thing for the officers to have their services spoken of so kindly by the chairman, and to receive from the shareholders such an expression of their approval. He believed he was fully justified in asserting that there was not a board of directors in existence who received more hearty and loving service from their staff than the board of the Phœnix Company, and it could not be otherwise than most gratifying to them to know that their endeavours to discharge their duty were so generously appreciated.

The proceedings then terminated.

SURREY CONSUMERS GAS COMPANY.

The Ordinary Half-Yearly General Meeting was held at the Terminus Hotel, London Bridge, on Monday, April 5—B. DUVAL, Esq., in the chair.

The SECRETARY (Mr. Boddy) read the notice of meeting, and the following report and accounts were then presented:—

The directors have much pleasure in laying before the proprietors the accounts for the half year ending the 31st of December last, which show a net profit, including the sum of £2009 7s. brought from the previous half year, of £15,564 11s. 8d., applicable for dividend. Out of this sum the directors recommend the payment of the customary dividend of 5 per cent. for the half year, less income-tax, leaving a balance of £4160 12s. 5d. to be carried forward to the next half year.

The long threatened attack upon the gas companies of the metropolis has begun. Three bills have been introduced into Parliament—No. 1, "For the compulsory sale of the gas companies," on insufficient terms as proposed by the bill; No. 2. "In default of such sale, to enable the Metropolitan Board of Works to compete with the existing gas companies by the establishment of independent gas-works;" and No. 3, "A bill to make further provisions for the regulation and control of the gas companies." The bills Nos. 1 and 2 have been withdrawn, and the efforts of your directors are now concentrated in opposing the bill No. 3, for the regulation and control of this company. The directors would not be justified in disguising the fact that there is considerable danger. The bill is promoted by the Metropolitan Board of Works, at the expense of the ratepayers, and is utterly unjust in its demands, and your directors again rely upon the committees of Parliament to see justice done to the gas companies.

The directors who retire from office at this meeting are Thomas Pocock, Esq., and John Liddle, Esq., both of whom being eligible for re-election, offer themselves accordingly. N. J. Powell, Esq., the auditor, also retires, and, being eligible, offers himself for re-election.

No. 1—REVENUE ACCOUNT, *for the Half Year ended Dec.* 31, 1874.

Dr. *Cr.*

To Manufacture of gas—					By Sale of gas—			
Coals, including dues, carriage, unloading, and trimming	£21,551	8	5		Common gas per meter at 4s. 6d. per 1000 cubic feet	£36,117	16	1
Salaries of engineers, superintendents, and other officers at works	570	0	0		Public lighting and under contracts, common gas	6,849	2	4
Wages (carbonizing)	3,896	19	0					£42,966 18 5
Purification, including £158 2s. 11d. for labour	357	15	6		Rental of meters			1,045 14 4
Repairs and maintenance of works and plant, materials and labour, less £70 received for old materials	5,541	16	10		Residual products—			
			£31,917 19 9		Coke, less £685 2s. 6d. for labour and cartage	8,049	7	9
Distribution of gas—					Breeze „ 13 8 0 „ „	148	10	6
Salaries and wages of officers (including rental clerks)	208	10	0		Tar „ 3 6 0 „ „	1,914	8	5
Repairs, maintenance, and renewal of mains and of service-pipes, including labour	2,450	5	9		Liquor „ 3 6 0 „ „	346	14	0
Repairs and renewal of meters	284	2	4					10,459 0 8
			3,002 18 1		Rents receivable			346 0 7
Public lamps—					Transfer fees			4 17 6
Lighting and repairing			784 17 9					
Rents, rates, and taxes—								
Rents payable	89	10	3					
Rates and taxes	1,375	17	3					
			1,465 7 6					
Management—								
Directors allowances	750	0	0					
Company's auditors	42	0	0					
Salaries of secretary, accountant, and clerks	499	8	0					
Collectors commission	392	11	2					
Stationery and printing	98	7	4					
General charges	264	18	2					
			2,047 4 8					
Law charges			37 15 2					
Bad debts	285	3	4					
Discount allowances	115	7	10					
			400 11 2					
Public testing-stations			15 0 0					
Total expenditure			£39,671 14 1					
Balance carried to profit and loss account, No. 3			15,150 17 5					
			£54,822 11 6					£54,822 11 6

No. 2.—CAPITAL ACCOUNT, *for the Half Year ended Dec.* 31, 1874.

					Certified Receipts to June 30, 1874.			Received since that date.			Total Receipts to Dec. 31, 1874.		
To Expenditure to June 30, 1874	£289,379	15	5	By Ordinary shares of £10 each.	£150,000	0	0	..			..		
Ditto during half year to Dec. 31, 1874—viz.:				Ditto shares of £10 each, £8 paid	79,875	0	0	£120	0	0	£229,995	0	0
New and additional meters	141	18	0	Bonds	60,000	0	0	..			60,000	0	0
Total expenditure	289,521	13	5								£289,995	0	0
Balance	473	6	7										
	£289,995	0	0										

No. 3.—PROFIT AND LOSS ACCOUNT, *for the Half Year ended Dec.* 31, 1874.

To Interest on debenture and bonds, to Dec. 31, 1874	£1,481	1	11	By Balance from last account	£13,509	7	0	
Interest on temporary loans, &c.	114	10	10	Less dividend on ordinary capital for the half year ending June 30, 1874	11,500	0	0	
Balance applicable to dividend on ordinary share capital	15,564	11	8				£2,009	7 0
				Amount from revenue account, No. 1			15,150	17 5
	£17,160	4	5				£17,160	4 5

No. 4.—GENERAL BALANCE-SHEET, *Dec.* 31, 1874.

To Capital—				By Cash at bankers	£5,449	10	8	
For balance, per account No. 2	£473	6	7	Do. in office	41	18	6	
Net revenue—							£5,491	9 2
For balance, per account No. 3	15,564	11	8	Stores on hand—viz.:				
Debenture interest for amount due to Dec. 31, 1874	1,481	1	11	Coals			1,750	0 0
Unclaimed dividends	260	12	6	Accounts due to the company:—				
Sundry tradesmen and others, for amount due for coals, stores, and sundries	22,474	10	7	Gas and meter rental, quarter ending Dec. 31, 1874	£29,373	8	3	
				Ditto, arrears outstanding	740	0	9	
							30,113	9 0
				For coke and other residuals products			2,569	10 2
				Sundries			329	14 11
	£40,254	3	3				£40,254	3 3

The CHAIRMAN, in moving the adoption of the report, said that although the gas companies of the metropolis generally were struggling against those who attacked their interests, the small attendance on this occasion proved to him that the shareholders of the Surrey Consumers Company, at all events, were not much alarmed at the present agitation. With reference to the company's works, they were never more efficient, and, thanks to the excellent way in which their affairs were managed, they had just got into good working order. If the public would only leave them alone, the 10 per cent. dividend was secure to the shareholders for life, but if they kept on agitating, and making the company spend large sums of money in defending their rights, there might be some little drawbacks. Personally he had no fear of the agitation now going on. Three bills had been introduced into Parliament by the Metropolitan Board and the corporation—one for the compulsory purchase of the companies, the second for the manufacture of gas—and both of these measures were withdrawn before the second reading, or, rather, the support of the Government could not be obtained, so they were not proceeded with. The third bill was very obnoxious, and was got up by men who had nothing to lose; but there always would be, he supposed, a set of agitators in England, who were envious at seeing others do well, and wanted to destroy their position. This Regulation Bill was tyrannous in every sense of the word, and he thought that the Legislature, in whom he had every confidence, would see the fallacy of the bill, which was to be read, if read at all, on the following day. Even if it should be read, and even if the companies were not to oppose it, he thought it would be so much modified that they would have nothing to fear. He was the largest shareholder in this company, and he had not sold, and did not intend to sell, a single share. As regarded the dividend of 10 per cent., he contended that it was not too much for a speculative concern to pay, regard also being had to the rate at which the shares were bought, which only yielded to investors about 6 per cent. The directors were bound to uphold those who had purchased shares in the company on the faith of the characters of the men who represented it, and it was their intention to do so. With a continuance of their trust in them, they could assure the shareholders that they would not flinch from the duty imposed upon them. He did not think, moreover, that they need be at all alarmed at the Regulation Bill, which had been promoted in the hopes of depreciating the value of the property of the companies, in order that it might be purchased below its value.

Mr. POWELL seconded the motion, which was put, and carried unanimously.

The CHAIRMAN moved the declaration of a dividend of 5 per cent. for the last half year, less income-tax. He said the meaning of that was, that though they had hitherto paid the dividend free of income-tax, it was thought advisable, on the present occasion, to follow the example of all the other companies.

The motion having been seconded, was put and carried, and the retiring directors and auditor were re-elected.

A SHAREHOLDER said there had been rumours afloat that meetings of the several companies in the south of London had been recently held, with the view to negotiations for an amalgamation. No reference was made to such a subject in the directors report, nor had the chairman alluded to it in his opening speech. If there were prudential reasons for withholding information at the present moment, he would not press for an answer to his inquiry; if not, he would ask the chairman to give the meeting some account of the negotiations.

The CHAIRMAN said the honourable shareholder put a question in reference to a rumour which had certainly not reached his own ears. All he could say, therefore, was that there had been no meetings for amalgamation, and he had never heard of negotiations with that object. There had been meetings of the directors of the gas companies on the subject of the bills before Parliament.

Mr. W. B. JAMES said if any negotiations did take place, the directors would embrace the earliest opportunity to lay them before the shareholders.

Mr. LIDDLE said the question had been discussed in the press, and had thus come under the notice of the directors; but nothing had been done to promote such a scheme.

Mr. BERESFORD said the meetings of the representatives of the companies to oppose the bills of the Metropolitan Board were, no doubt, the meetings to which the shareholder referred.

Mr. ATTRELL moved a vote of thanks to the chairman and directors. He thought the shareholders could not do better than leave their affairs in the hands of the board. As far as he was concerned, he had every confidence in them.

The motion having been seconded and supported, was put, and carried unanimously.

The CHAIRMAN said, on behalf of his colleagues, and for himself, he felt thankful for this mark of the approval of the shareholders. The directors felt the responsibility of the duty they had to perform, as well in the interests of the consumers as of the shareholders, and he was confident that if ever the gas undertakings of the metropolis passed out of the hands of their respective boards into the hands of the Metropolitan Board, there was no prospect of their being as well conducted as at present. There was a kind of rivalry under present arrangements as to which company could produce the best results, and supply the public with the purest and cheapest gas. There was also the certainty that the consumers could obtain redress if they had anything to complain of, whereas there would be little chance of it with the Metropolitan Board, whose notions of justice might be judged of from the fact that, though they would bind the companies down with the most stringent regulations, they actually refused, in their own bill for supplying gas, to submit to any restrictions as to price, quality, or anything else. The board themselves, by the expense they were continually putting the companies to, prevented reductions of price which might otherwise take place. They had been ordered to make a return to the House of Commons of all the expenses they had incurred during the last six years, in promoting and opposing gas bills, and he (the chairman) had been informed, on high authority, that it would amount to £150,000! It must be remembered, also, that something like the same amount must have been expended by the companies in defending their interests against the attacks of the board.

Mr. SMITH moved a vote of thanks to the secretary and the engineer, which was seconded by Col. WILBRAHAM, and carried unanimously.

Mr. BERESFORD asked the meeting to supplement the vote just passed, so far as the secretary was concerned, by voting an increase of £100 a year to his salary. He believed that a more deligent, upright, and painstaking secretary did not exist, either in or out of the metropolis.

Mr. ATTRELL moved a resolution to that effect, remarking that he had known Mr. Boddy for many years, and had seen the able manner in which he discharged the duties of his office.

Col. WILBRAHAM seconded the motion, which

The CHAIRMAN cordially supported, and observed that the duties of the secretary were three times as onerous as they were formerly, and that Mr. Boddy was well worthy of the entire confidence of the directors and of the shareholders at large. Referring to the engineer, he said he was not a man who dealt largely in flattery, but he felt bold to say there was no one in London better qualified to fill the office of engineer to an important company than Mr. Finlay. He had entirely reinstated the property of the Surrey Gas Company, and restored it from being the greatest dog-hole in the world, to be one of the most efficient gas-works in London. He had no hesitation in saying that it was to Mr. Finlay the shareholders had to look principally for their 10 per cent.

The motion having been carried,

The SECRETARY returned thanks for the liberal acknowledgment, as he said, which the shareholders had vouchsafed to his services. He would endeavour, as far as lay in his power, to continue the same course he had hitherto pursued in conducting that department of the business of the company which came under his care.

The ENGINEER said he felt deeply sensible of the obligations the meeting had conferred upon him, and would remark at the same time that it was a source of great gratification to him to hear the way in which the services of Mr. Boddy had just been referred to. He had worked with Mr. Boddy for the last 14 years, and during the whole of that time there had never been a discordant word between them. When the officers of a company worked together so pleasantly as they had done, he felt sure that it must tend to the advancement of the interests of the shareholders. For himself, while thanking the meeting for kindly recognizing his services in the past, he would pledge himself to deserve their best opinion in the future.

ABERDEEN (CORPORATION) GAS SUPPLY.

At the Meeting of the Aberdeen Town Council on the 5th inst., the following Report by Professor Brazier on the quality of the gas supplied for the first quarter of the year was submitted:—

University of Aberdeen, March 30, 1875.

During the past three months the testings of the illuminating power and the purity of the gas supplied to the corporation have been continued and I beg to report as follows:—

PHOTOMETRIC POWER.

Results of Experiments made in accordance with Clause 100 *of the "Aberdeen Municipality Extension Act*, 1871."

Visit made.	First Observation.	Second Observation.	Mean.
December 28, 1874. . . .	30·30 candles. ..	30·33 candles. ..	30·31
February, 6, 1875	29·90 ,, ..	— ..	29·90
March 15, 1875	29·93 ,, ..	30·05 ..	29·99

During the past quarter the gas when tested has been very free from the ordinary impurities of ammonia, sulphuretted hydrogen, and carbonic acid—at most, only traces of ammonia being detected. (Signed) JAS. S. BRAZIER.

The following report by Mr. Smith, the manager of the gas-works, on his examination of Malam's patent process of gas-making was presented:—

To the Gas-Works Sub-Committee of the Town Council of Aberdeen.

Corporation Gas-Works, Aberdeen, March 22, 1875.

Gentlemen,—In accordance with your instructions, I have visited the Dumfries Gas-Works with a view to determine the merits of Malam's improved system of gas-making, and beg to submit the following report thereon:—

On my arrival, I found Mr. Malam was not in a position to allow a trial to be made, but after a lapse of some time, I commenced my experiments on the evening of Wednesday, the 10th of March.

The retorts are D-shaped, 12 feet long, and open at both ends, 27 inches wide, and 16 inches high; 4 feet of the retorts at the ends next the ascension-pipes and patent condensing mouthpieces are kept constantly charged with coke, which is said to arrest and decompose the lighter hydrocarbons usually found in the tar, thus adding to the quantity of gas.

The coals experimented on appeared to be a mixture of Drumpark and Auchlosan, four tons of which were carefully weighed and carbonized, yielding 37,500 cubic feet of gas, as measured by the station-meter, being on an average 9375 cubic feet per ton of an illuminating power of 26·49 candles.

In order to satisfy myself as to the quality of the coals, I had a sample sent to Aberdeen, and ascertained from trials in my experimental gas apparatus that they produced (after deducting 5 per cent.) 9488 cubic feet of gas per ton, of an illuminating power of 26·29 candles, which should be obtained in actual practice on a large scale.

From these results you will observe that the quantity and quality of the gas produced are practically the same on the new and old system.

Seeing the result was so far below what was guaranteed by Mr. Nelson, the patentee's agent, I brought samples of tar from the hydraulic main and boxes under the ascension-pipes. These I had analyzed by Messrs. John Miller and Co., Sandilands Chemical Works, who, from the subjoined letter, report that it contains from one-fourth to one-third more light oil and naphtha than the tar from the Aberdeen Gas-Works usually does; thus showing that the coals at the Aberdeen Gas-Works are more thoroughly carbonized on the ordinary system than on Malam's improved principle.

The foregoing experiments I have carefully worked out, and I am of opinion that if Malam's process of gas-making was adopted at the Aberdeen Gas-Works, it would effect no improvement in the production or quality of the gas, and would cause a loss of at least £1400 yearly from the ammoniacal liquor being rendered useless by mixing with the jets of water from the ascension-pipes, and allowed to run to waste.

(Signed) ALEX. SMITH.

The following is the letter of Messrs. Miller:—

Sandilands Chemical Works, Aberdeen, March 22, 1875.

Sir,—The gas tar you handed us the other day, as taken from the hydraulic main of the Dumfries Gas-Works, contains from one-fourth to one-third more light oil and naphtha than is usually present in the tar coming from your own hydraulic main.

The sample marked as having been drawn from the boxes under the patent condensing mouthpieces at Dumfries seems likewise to contain a larger proportion of light oil and naphtha than an average of your own tar generally does.

Mr. Alex Smith, Aberdeen Gas-Works. (Signed) JOHN MILLER AND Co.

Baillie ESSLEMONT said that when this matter of Malam's patent was urged time after time upon the attention of the committee, they did not think that they would be doing justice to the community if they did not give an opportunity for thoroughly testing this or any other improvement that might be put before them. They had, therefore, taken means for satisfying themselves upon this patent, and the information Mr. Smith had brought was now before them, and spoke for itself. The committee were very willing and very desirous to introduce into the Aberdeen Gas-Works any improvement that should be brought out, and as they were putting in some additional retorts, if they had seen any advantage in this patent, they could have introduced it at once without any extra expense to the Town Council.

RIO DE JANEIRO GAS COMPANY, LIMITED.

The Tenth Annual General Meeting of Shareholders was held at the London Tavern on Friday last—A. D. MACGREGOR, Esq., in the chair.

The SECRETARY (Mr. T. DAWSON) having read the notice of the present and the minutes of the last meeting, the following report and statement of accounts were submitted:—

The directors regret to announce the retirement from the board, from motives of health, of their respected late colleagues, Mr. Richard Carruthers and Mr. James Atherton, and desire to record their appreciation of the valuable assistance to the interests of the company rendered by those gentlemen.

In accordance with article 86 of section 15 of the Articles of Association, the directors have elected to fill the seats thus vacated, Mr. John Henry James and Mr. Joseph Hancox, both duly qualified and original shareholders, of whose co-operation in the business of the company the board have already felt the benefit.

The directors, in accordance with the Articles of Association, paid on the 6th of October last an interim dividend of £36,000, free of income-tax, being at the rate of 10 per cent. per annum on the present paid-up capital of the company, and now have the pleasure of submitting to the shareholders the annexed statement of accounts for the year ending Dec. 31, 1874, and showing a balance at the credit of profit and loss account of £80,520 2s. 9d., reduced by the above-mentioned interim dividend to £44,520 2s. 9d.

Out of this sum of £44,520 2s. 9d. the directors recommend that a dividend at the rate of 10 per cent. per annum, free of income-tax, be paid for the half year ending the 31st of December last: this payment, with that of the interim dividend, together £72,000, leaves £8520 2s. 9d., which the directors propose to dispose of by placing £6000 to the insurance and contingency fund, and carrrying forward to next account £2520 2s. 9d., out of which income-tax for the past year has been paid.

The insurance and contingency fund accordingly stands at £25,006 18s., and the reserve-fund remains at £4000.

Up to the 31st of December last there had been expended on the gasholder No. 3 and new mains £112,744 1s. 5d., and £1416 8s. 2d. since then.

Circumstances came to the knowledge of the board some months past which gave them good reason for believing that a firm, from whom the company had purchased cannel coal, had not properly fulfilled their contract. The board have felt it their duty to take legal proceedings in the Scotch courts against the firm in question, and which are being actively prosecuted.

His Excellency Viscount de Maua is the retiring director in accordance with the Articles of Association, and, being eligible, offers himself for re-election.

The auditor, Mr. Harding (of the firm of Harding, Whinney, Gibbons, & Co.) also retires, and offers himself for re-election.

Dr. *Balance-Sheet, for the Year ending Dec.* 31, 1874. *Cr.*

Capital, authorized by the Brazilian Government	£750,000	0	0	Sundry assets—viz.: Gas-works, houses, land, 128 miles of mains, asphalte works, mules and carts, lighters, &c.	£582,705	14 8
Shares still to issue . . .	30,000	0	0	Outlay on gasholder No. 3 .	19,036	1 9
Issued to date, 36,000 shares of £20 each, fully paid up	£720,000	0	0	Ditto, on new mains. . .	93,707	19 8
Sundry creditors at Rio and London	16,528	19	8	Coals	25,380	0 0
Dividend warrants still unclaimed	1,499	12	0	Gas-fittings	8,326	1 5
Bills payable	13,206	18	7	Sundry debtors, being gas consumers at Rio . . .	45,130	19 7
Reserve-fund	4,000	0	0	Cash at Rio	4,608	16 10
Insurance and contingency-fund—				Cash in London	1,176	5 9
Balance brought forward from Dec. 31, 1873 . . .	19,006	18	0	Bills receivable, in hand. .	25,186	10 8
Amount carried to this fund this year	6,000	0	0	Shipments afloat	13,504	0 8
Profit and loss—				Interim dividend of the 6th of October, paid to shareholders at the rate of 10 per cent. per annum, on £720,000	36,000	0 0
Balance of profit brought forward from the 31st of December, 1873 . £2,183	2	1				
Less income-tax for 1873 . . 1,173	3	6				
	£1,009	18	7			
Net profits for present year.	79,510	4	2			
	£80,520	2	9			
Ded. carried to insurance and contingency-fund . . . 6,000	0	0				
	74,520	2	9			
	£854,762	11	0		£854,762	11 0

The CHAIRMAN: Gentlemen, in presenting our report for your acceptance, I have very few observations to make. I am sure you will very much regret the motives which compelled our late colleagues and worthy friends, Mr. Richard Carruthers and Mr. James Atherton, to resign their seats at the board. The services rendered by these gentlemen during the period they held office in the company were most valuable, and entitle them to our grateful acknowledgements and thanks. In their stead, and according to the Articles of Association, we have elected Mr. John Henry James and Mr. Joseph Hancox, and these gentlemen have already, by their labours, rendered service to the company. In regard to our business, leaving aside the figures you have before you already, I have merely to state that, notwithstanding the high price of coals during the year—contracted for previous to the decline in the market—and which averaged 65s. 4d. per ton in the year 1874, against 54s. in 1872; and also the increase in wages and salaries, which we hesitated at first, but were obliged ultimately to submit to, on the recommendation of our chairman on the other side; the enlargement of our works, and the extension of our mains, both in length and diameter, to meet the requirements of the Government; we have been able, as you see, to give you a dividend of 10 yer cent., free of income tax, upon our increased capital (and I must remind you that the increased capital demands £12,000 a year to meet it), and besides passing £6000 over to the contingent and insurance fund, we carry £2520 to our next account, on which the income-tax has been paid. This state of things you will, I think, agree with us is, upon the whole, highly satisfactory. I see no interruption to our progress, unless some very unforeseen circumstances should arise. In reference to our dispute with our late contractors, the board having strong reasons for the conviction that they did not fulfil their agreement to the letter, deemed it their duty to take proceedings against them. The matter was placed in the hands of the solicitor, and is now before the law courts in Scotland. You will, therefore, admit that it is neither desirable nor expedient to discuss the question on this occasion. I have to inform you that the Brazilian Government, with a view to the renewal of our contract, directed a commission to look into our works, and to examine all the details of our business. This commission met with every

information from our officials, they have sent in their report, and we are now only waiting the action or initiative of the Brazilian Government to enter into these negotiations. Our friend and worthy chairman on the other side is fully empowered by your board to represent your interests in the matter, and the result of the negotiations will be placed before you, before any decision is arrived at. With these few remarks I propose that the report be adopted, at the same time expressing my willingness to offer any explanations that may be required by the shareholders.

Mr. J. H. JAMES seconded the motion, which, after the chairman had replied to some questions in explanation of the coal contract, was put and carried.

The CHAIRMAN moved—"That a dividend of 10 per cent. per annum, for the year ending the 31st of December last, free of income-tax, be now declared."

Mr. LEWIS HOWARD seconded the motion, which was agreed to.

On the motion of the CHAIRMAN, seconded by Mr. JAMES, it was resolved—"That his Excellency the Viscount de Mauá be re-elected a director of the company." Mr. Harding was re-elected auditor, and his remuneration fixed at £21.

The CHAIRMAN then proposed that a special vote of thanks be given to their late worthy friends and colleagues, Messrs. Richard Carruthers and James Atherton, for the valuable services they rendered to the company while they filled their seats at the board.

The motion was seconded by Mr. JAMES, and carried unanimously.

Thanks were also voted to Mr. Lewis Howard, the managing director, to the board, and to the chairman, after which the proceedings terminated.

MANCHESTER (CORPORATION) NEW GAS-WORKS.

A Meeting of the Town Council of Manchester was held on Wednesday, the 7th inst.,—the MAYOR (Alderman King) in the chair.

A report was brought up from the Gas Committee in reference to the site offered by the agent of Sir Humphrey de Trafford at Barton Moss, for the proposed new gas-works, was submitted. The report stated that the ground was entirely unsuitable, in consequence of the character of the strata, which would render the cost of works there very great. In addition to this the committee were satisfied that enormous difficulty and inconvenience would arise in the administration of the gas-works by the committee, if they were situated at a distance of six or seven miles from the city. The estimated cost of the mains and works for bringing the gas from the proposed site to Old Trafford (but not including anything for the erection of gas-works thereon) would be over £300,000, which would be additional to the sum required if the works were erected on the site suggested by the committee at Bradford Road. Difficulties would also arise in the sale of coke, tar, and ammoniacal liquor, which find a ready market in town; and the poor people in the neighbourhood of the gas-works would be deprived of the advantage they now enjoy of buying their coke cheaply. The labour supply, in an isolated place like Barton Moss, also involved difficulties as to house accommodation, and as men only could be engaged, some provision would have to be made for the occupation of the older children and women. The conclusions of the report were summed up as follows:—

Your committee, after the most careful consideration, are convinced that to erect works on or near the site offered, and to convey the gas from such site to the city, would involve in the first instance a very large additional expenditure beyond anything which could be required at Bradford; that, in the working, the disadvantages shortly referred to would have to be anticipated, and either the prices now charged for gas must be increased, or the profits at present available for public improvements would disappear, and the imposition of an improvement-rate become an absolute necessity. Your committee have, after most careful consideration of the whole subject, come to the unanimous conclusion that it is not expedient further to entertain any site for gas-works on Barton Moss. Being desirous fully to satisfy and carry out, so far as possible, the wishes of every member of the council, your committee determined to advertise for sites, and in answer to such advertisements three sites only were offered. Your committee, in company with the city surveyor, visited the sites, and they came unanimously to the conclusion that neither of the sites was suitable for the purpose of the new gas-works for the city. Subsequently a fourth site was offered, situate in the neighbourhood of Patricroft; but as many of the objections already stated as applicable to the Barton Moss site would also apply to this, and as the site itself is too limited in extent for the purposes required, your committee did not deem it necessary to inspect it. Your committee, under the circumstances, again ask the council to authorize them to erect, with as little delay as possible, new works to the extent urgently required, upon the site which for that purpose has been secured by this corporation.

Alderman LAMB, in moving the adoption of the report, said the Gas Committee were of opinion that, unless the council should give them power at once to prepare for the erection of new works on the land near Bradford, they could not undertake to meet the demand for gas that would be made upon them. In the committee's report for 1869 they stated that if the gradual and steady increase of consumption continued as it had done for the previous 30 years, in 1875 the supply would not be equal to the demand. That condition of things happened in December last, and all knew what grumbling arose in consequence. In the town-hall they had been obliged to use candles. That being the case, what would happen when the new town-hall was completed, and those palatial buildings that were being erected in Victoria Street, Deansgate, and other places, and which would consume hundreds, if not thousands, of millions of cubic feet? The dissatisfaction would be such as the council now hardly contemplated. And who would be to blame? Not the Gas Committee, who, if they had had their own way, would have had a sufficient supply of gas last December. In their present report the committee asked for permission to erect such new works on the land near Bradford as would enable them to meet the demand for gas as it arose. There was no other site that the committee had seen that was as suitable. The committee had visited the land at Barton Moss belonging to Sir Humphrey de Trafford; they had taken the city surveyor with them, and they had to report that a more costly and unsuitable site could hardly be found anywhere. He did not know one member of the Gas Committee that had not condemned it. The expense of laying down pipes from there would be enormous. They would have to build a colony of houses for the workmen, and what were they to do with the women and children? There would be no churches or schools for them. A more Utopian scheme than the erection of works at Barton Moss never entered a man's head. Then where were they to get their coal from, and what were they to do with their coke, their tar, and their ammoniacal liquor, &c.? It was monstrous to think of such a place. He was aware that the councillors of the New Cross ward and the ratepayers at the top of Bradford Road were in opposition to the works being erected in that neighbourhood, and he did not blame the members of the ward, for they were moved by somebody else. All this opposition had originated with one or two wire-pullers, who were persons of no influence in the ward. The value of the property in Gaythorn, Regent Road, and Rochdale Road—in the neighbourhood of the existing gas-works—showed how absurd was the objection to the new works that property in Bradford Road would be deteriorated. He would not say a word to the detriment of New Cross ward, and he would honestly say that, if he thought the new works near Philips Park would injure that ward in any respect, he would oppose the proposition of the Gas Committee. He contended that the supposed opposition to the scheme in New Cross ward and Bradford Road was unreal, and caused much merriment by reading a voluminous document containing precise and minute instructions for getting up and maintaining the agitation on the subject. Premising that no one in the council knew how this document had come into his possession, he explained that it had been addressed to several councillors, who had taken an active part in the few meetings that had been held. The writer of these instructions, he maintained, was the head and front of the opposition. There was no population in this gentleman's immediate neighbourhood, but he wrote, "Personally I am disgusted at the idea of gas-works being put down under my very nose, and am determined to do all I can to prevent its being put down." This gentleman called upon the town councillors, to whom he wrote to advertise themselves to be present at all the meetings. He said that care ought to be taken to appoint a secretary of ability, energy, and business tact; anybody almost would do for a treasurer, only let him be a man of influence. He mapped out the district in blocks, and suggested that each canvasser should be responsible for getting the signature of every householder in these blocks. He suggested that "to fill up the intervals between the meetings, and keep the agitation from flagging, letters should be written to the local papers nearly every day." But the agitation having failed, it had been resolved to go upon another tack, and obtain a scientific opinion that gas-works were a nuisance, and prejudicial to health. It was, however, as well ascertained as anything could be, that the *employés* at gas-works enjoyed an exceptional immunity from diseases which were not brought on by their own improvidence or profligacy. The atmosphere of a gas-work was a well-known antiseptic. Mr. Davies, at one of his meetings, had parodied Tennyson, and declared that the people at Bradford had

> Gas-works to right of them,
> Gas-works to left of them,
> Gas-works in front of them,
> And stinks all around them.

Well, he asked, if they had stinks all around them, was that not the place to put the gas-works? He did not know anything that would neutralize these nuisances except gas. Alderman Lamb proceeded to urge the necessity for obtaining new gas-works somewhere. The Town Council were responsible for supplying the whole constituency with gas, and in the face of the short supply of last winter, and the increasing demand, it was impossible to sacrifice the public interest to a forced and unreal agitation, which had been got up by a few individuals in one part of the city. He maintained that the committee were shut up to the Bradford Road site, but he denied that the gas-works there would be in any sense unsightly in that position, as they would be almost concealed in the valley, alike from Bradford Road and Ashton Road. With respect to Philips Park, that was ruined already, and he suggested that the Gas Committee should buy the park at its original cost, and then they would be able to put down sufficient gas-works to provide the city with an abundant supply of gas, and get rid of the disgrace of Sunday work, while at the same time, with the purchase-money of the park, they could supply one or more parks or recreation grounds in more suitable and equally accessible sites, where vegetation would have some chance of flourishing.

Mr. TOWNSEND seconded the resolution.

Alderman MURRAY moved an amendment,—"That it is not desirable to erect new gas-works within the city at all." He blamed the Gas Committee very much for their management of this question. It was now four or five years since the council, by a very decisive majority, told the Gas Committee that they would not permit them to erect gas-works upon this site. In the interval, the Gas Committee had been inactive for the purpose of placing the city of Manchester in a hole for want of gas. They had made up their minds, by whose advice he did not know, that they would have the gas-works on this site, and no other. A more outrageous report than that which the committee had presented to the council that morning had never been placed in the hands of a public body, and he regretted that it should be signed by the mayor. The committee had gone to Barton Moss, and they had confined their attention to one site, and had tied down the hands of Mr. Lynde in a manner which had placed him in a most unfortunate position as a professional engineer. They had put down the price of mains at £300,000, and this estimate was very staggering, but he did not place any confidence in it. The scheme represented two 4-feet mains, which would be capable of bringing 40 million cubic feet of gas into the city per day, which was just four times the requirement of the city. He scouted the argument stated in the report as to the inconvenience and difficulty which would arise in administering the gas-works at so great a distance as the Barton Moss site, and quoted the example of the gas-works at Beckton and those of other London gas companies, who were taking their works from the heart of the city to sites in the country miles distant, and were capable of doing so consistently with earning a profit.

Mr. W. G. BENNETT seconded the amendment.

Mr. W. SMITH, supported the amendment, and asserted that the feeling of the people of New Cross ward against the committee's scheme was genuine and hearty. He protested, in the interests of those who had buried their relatives in the Bradford Cemetery, against the putting down of gas-works in its immediate vicinity, and in the interests of the public who used Philips Park.

Mr. J. A. BIRCH said he was sorry that Alderman Murray had thought it right to carry on the discussion by indulging in personalities, and he was sure it was a bad cause which required recourse to such tactics. He said that the property owners in the neighbourhood of the proposed site had declined to join in the opposition to it, because they believed that, so far from gas-works injuring their property, they would improve it.

Mr. HARWOOD opposed the Bradford site on the ground that from its height the gas supplied from it into the town would require to be driven down by pressure. It would be more natural and reasonable that the works should be placed on a lower level than the city which had to be supplied, so that the gas might follow its natural tendency to rise. If the Barton Moss site had been found unsuitable, it was still the duty of the committee to endeavour to obtain a site on the lower side of the town, and at a point removed from population. He ridiculed the labour difficulty which had been raised against the placing of gas-works at a distance from populated places, on account of the dearth of labour. He said that wherever labour was offered labourers would be found, and enterprising people would be ready to build houses for them to live in. He thought that the committee ought to obtain some professional assistance in their search for a site.

Alderman CURTIS defended the Gas Committee from the charge of inaction which had been raised against them by Alderman Murray, and by an exhaustive review of the proceedings of the committee and of the council argued that they had been forced into the difficulty in which they were now placed. In regard to the question of mains from Barton Moss, he admitted that at present a 4-feet main was not required. But he pointed out that a 30-inch main would only bring in 12,500,000 feet of gas per day, and the daily consumption had already reached 10,500,000, and was yearly increasing at a rapid rate, and in a couple of years a main of that size would be altogether inadequate. A duplicate main was only a provision of safety, necessary to prevent the city being left in total darkness through any accident arising to one of the mains.

Alderman BOOTH moved that the council do adjourn till that day month, and after some discussion it was agreed, by a large majority, to adjourn the meeting till next Wednesday, when the Gas Committee's report will be the first order on the *agenda* paper.

INFLAMMABILITY OF GLYCERINE.—In studying the properties of a chemically pure glycerine, obtained from the Apollo Candle Factory at Vienna, M. Godeffroy ascertained that it ignited when heated to a temperature of 150° Cent., and burned with a uniform blue flame of feeble illuminating power, without producing the slightest odour, and leaving no residuum. Its density was 1·2609. Glycerine of a still lower density may likewise be burned by the aid of a mesh or a piece of cotton, and in this case also there is an absence of smell, even at the moment of extinguishing the flame.

METROPOLIS GAS SUPPLY.

Metropolitan Board of Works.

At the meeting on Friday last,

Mr. Legg asked the solicitor the following question:—Under what particular section or sections of the Metropolis Local Management Acts was the board authorized to spend the money of the ratepayers in preparing and promoting the Metropolis Gas (New Works) and the Metropolis Gas Undertakings (Purchase) Bills that have been withdrawn?

The Solicitor said he had prepared an answer.

Mr. Richardson remarked that it was a matter for consideration whether this question should be asked at the board, and not rather at a committee, where a member could easily obtain the desired information. It was for them to decide whether they would permit a precedent of this kind. He moved that the question should be put in committee.

Mr. Runtz said he entirely agreed with Mr. Richardson; the precedent was a most dangerous one. It was an extraordinary question for any member of that board to put.

Mr. Legg thought the answering of his query very material. He had always understood that the proceedings of the board were public, and, if so, he saw no reason why the question should not be answered. If it were not, the public might say that they had no power to make these charges. As on former occasions they were surcharged for costs, he was anxious that everything with regard to this particular instance should be made clear.

Mr. Newton thought that questions like this were improper, yet, under the circumstances of the case, he would rather have it answered. Seeing that it was put in favour of the gas companies by gentleman who had a new-born zeal for them, the board should show that they were perfectly easy on the subject.

Mr. Lloyd said if any one were likely to be injured by asking this question, it was a member of the board, who did not put it for the sake of gaining information. He was afraid to say what might be his motive. The point for consideration really came to this: Was it advisable for any member to put a question to be answered by their officers as to what the power of the board was to incur any expense they had resolved upon? He thought the subject should come before the Works and General Purposes Committee.

On a vote being taken, 16 were in favour of this latter course, and 10 were opposed to it.

Mr. Harris stated that he had voted for the motion by mistake.

Mr. Legg asked would this rule future proceedings; to which the Chairman replied that he could not, of course, control the action of the board.

Dr. Letheby, the chief gas examiner appointed by the Board of Trade, has recently reported to the City authorities and to the Metropolitan Board of Works, the results of the daily testings of the gas supplied by the Chartered, the Imperial, and the South Metropolitan Gas Companies during the quarter which ended on the 31st of March last. There are nine testing-places where the gas from the several works of the companies is daily examined by the officers of the City and Metropolitan Board of Works; and the illuminating power of the gas, when burned at the rate of 5 feet an hour from a Sugg's "London" Argand, No 1, with a 6-inch chimney, in the case of common gas, and from a Sugg's steatite bat's-wing, No. 7, in the case of cannel gas, as prescribed by the referees, has been equal to the following number of standard sperm candles at each of the nine testing places:—

Illuminating Power in Standard Sperm Candles.

	Description of Gas and Testing-Place.	Max.	Min.	Aver.
Chartered Co.	Common gas, Beckton	18·7	16·1	17·37
	,, Friendly Place	17·7	16·0	16·86
	,, Ladbroke Grove	18·0	16·1	16·92
	Cannel gas, Millbank	22·4	20·2	20·94
Imperl. Com.	Common gas, Carlyle Square	17·0	15·2	16·17
	,, Camden Street	17·2	14·3	16·04
	,, Graham Road	18·5	15·0	16·93
	,, Bruce Terrace	17·3	15·3	16·22
	South Metropolitan Company, Hill Street	16·6	15·3	15·94

These results show that the Illuminating power of the gas at each of the testing-places has been constantly above the requirements of the Acts of Parliament by which the companies are regulated.

As regards purity, Dr. Letheby reports that the gas at all the testing-places has been quite free from sulphuretted hydrogen, and the amounts of sulphur in other form than this have been as follows:—

Grains of Sulphur per 100 Cubic Feet of Gas.

	Description of Gas and Testing-Place.	Max.	Min.	Aver.
Chartered Co.	Common gas, Beckton	16·7	7·2	10·97
	,, Friendly Place	19·7	5·7	13·18
	,, Ladbroke Grove	31·9	8·7	19·40
	Cannel gas, Millbank	22·2	12·0	17·63
Imperl. Com.	Common gas, Carlyle Square	23·0	14·3	17·49
	,, Camden Street	21·5	11·4	15·10
	,, Graham Road	21·1	11·3	16·18
	,, Bruce Terrace	23·8	6·4	10·89
	South Metropolitan Company, Hill Street	30·0	10·9	18·33

It thus appears that the average proportions of sulphur in the gas of the three companies have been much below the prescribed quantities. On four occasions, however, the amounts of sulphur in the gas of the Chartered Company at Ladbroke Grove was in excess of the quantity. The same was the case with the gas of the Imperial Company at Bruce Terrace; and on three occasions the gas of the South Metropolitan Company contained an excess of sulphur. Dr. Letheby reports that the excess of this impurity in the gas at Bruce Terrace was due to accidental and unavoidable causes; and, in accordance with the provisions of the Imperial Company's Act of Parliament, he has so certified.

The maximum amounts of ammonia in the gas have been 3·8 grains per 100 cubic feet at Beckton, 2 grains at Friendly Place, 0·4 at Ladbroke Grove, 0·5 at Millbank, 0·7 at Carlyle Square, 1·5 at Camden Street, 0·2 at Graham Road, *nil* at Bruce Terrace, and 1·6 at Hill Street, Peckham. On two occasions the ammonia in the gas at Beckton contained an excess of this impurity—the prescribed quantity being 2·5 grains per 100 cubic feet.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone during March:—

1875.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogen.
	*Mean of 22 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Comp.'s gas	16·19	16·80	15·01	22·91	9·98	20·99	0·76	No trace
Chartered Comp.'s common gas	16·14	16·91	15·10	27·60	14·03	17·22	0·40	No trace
Chartered Comp.'s cannel gas	21·69	23·30	19·31	19·37	11·16	22·11	0·83	No trace

Mean of daily readings of barometer . . . 29·98
,, ,, ,, thermometer . . . 55·86

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the Imperial Company's gas was equal to the light of rather over 16 sperm candles; it ranged between 15 and 16·80 candles; three times only it fell below 16 candles. The mean quantity of sulphur found in 100 cubic feet of this gas was 21 grains, and of ammonia three-quarters of a grain. The mean light of the Chartered common gas was equal to rather more than 16 candles; it ranged between 15 and 17 candles; six times it fell below the standard of 16 candles—a circumstance which has, I presume, been satisfactorily explained to the chief gas examiner. The mean amount of sulphur found in this gas was rather over 17 grains, and of ammonia 4-10ths of a grain. The mean light of the cannel gas was equal to 21½ candles; it ranged between 19·31 and 23·30 candles; twice it exceeded 23 candles. The mean quantity of sulphur found was 22 grains, and of ammonia 8-10ths of a grain. The pressure of all the gases was satisfactory, and on no occasion was sulphuretted hydrogen detected in either of them by the usual tests. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works, Beckton and Bow.

Dr. Stevenson's report on the gas supplied by the Imperial Company to the vestry of St. Pancras, during the month of March, 1875:—Maximum light, estimated by sperm candles, according to the Act—14·9. Minimum light, sperm candles—13·2. Average light, sperm candles—14·1. Traces of ammonia, indicated by turmeric test-paper—traces only on every occasion. Traces of sulphuretted hydrogen, indicated by lead test-paper—none on any occasion. Sulphur, 24·5 grains per 100 cubic feet.

METROPOLIS WATER SUPPLY.

Dr. Whitmore's report on the composition of the Thames companies and other waters supplied in Marylebone during March:—

1875.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling, in degrees.	Hardness after boiling, in degrees.
	March, 1874. 0°	March, 1875. 0°	March, 1874. 0°	March, 1875. 0°	0°	0°
Distilled Water . . .						
West Middlesex water	21·48	20·88	0·92	0·80	14·14	3·98
Grand Junction water	21·84	21·12	0·96	0·96	14·47	4·21

* The loss by incineration represents the amount of organic and other volatile matters contained in the Imperial gallon (70,000 grains) of water.

Owing to the diminished amount of rainfall during the month, the amount of solid matter contained in the water of both companies was considerably less than in the two previous months; and there was also in the water supplied by the West Middlesex Company, a corresponding reduction in the quantity of organic matter. The water supplied to the parish by this company was clear, bright, and well filtered. That supplied by the Grand Junction Company was on one or two occasions slightly turbid.

ON ACCIDENTAL EXPLOSIONS.

By F. A. Abel, F.R.S., President, Chemical Society.

The following are extracts from a very important lecture delivered at the Royal Institution. We omit those parts which relate to explosives, properly so called:—

The winter of 1874-5 has been unusually prolific in so-called accidental explosions. On Chrismas Eve a colliery explosion entailed the sacrifice of 17 lives, and on one day last January *The Times* published accounts of no less than six fatal explosions—two in collieries involving the loss of 11 lives; three boiler explosions, by one of which seven persons were killed and 20 injured; and one coal gas explosion, by which two lives were lost. All these were of the class ordinarily termed accidental, but in every case the casualty was traced to a cause which could have been foreseen and guarded against.

The term "accident," applied in its strict sense to disasters caused by explosions, would imply that these were due to some circumstance, or combination of circumstances, entirely unforeseen, and that they were consequently unpreventible. An explosion which occurs during the preparation or investigation of a compound, the explosive nature of which is as yet unknown, may be purely accidental, but if, after the properties of the substance have been thoroughly ascertained and made known, an explosion occurs during its production, by some person who has not properly made himself acquainted with, or has neglected, in some point or other, those conditions essential to its production with safety, the knowledge of which is within his reach, the term "accidental" can certainly not be properly applied to it, although in all probability it would be so designated popularly, and even by those entrusted on behalf of the public with the investigation of its origin and results. The explosion occasioned by a person employing a lighted candle to search for a gas escape in a room where there is a powerful odour of gas, or a gunpowder explosion resulting from the dropping of a spark into an open powder-barrel from a candle which is held over it, should properly have as little claim to be called "accidental" as a boiler explosion occasioned by a person tying down the safety-valve. There may be criminal intent in the latter case which is entirely absent in the two former; but the probability of an explosion could have been equally foretold in all three instances, and though ignorance may perhaps be pleaded as an excuse in the case of the gas explosion, and carelessness made to account for that of the powder, those pleas cannot be accepted as grounds for regarding the resulting disasters as legitimate accidents. Indeed, it is often impossible to forbear stigmatizing as criminal the carelessness or ignorance which gives rise to explosions of the kind popularly accepted as accidental.

In the present discourse it is proposed to accept the definition "accidental" in the loose sense in which it is popularly applied to explosions, with the object of examining into the nature and causes of such explosions, and, if possible, of indicating directions in which there may be hope of successful efforts being made for reducing the frequency of their occurrence.

The phenomena attendant upon an explosion are generally due to the sudden or very rapid expansion of matter, accompanied in most instances by its change of state from solid or liquid to gas or vapour. The most simple classes of explosions are those caused by the sudden yielding to force, exerted from within, of receptacles in which a gas is imprisoned in a highly compressed condition, or a liquid has been raised to a temperature greatly exceeding that at which its molecules have a tendency to fly asunder, or to assume the state of vapour or gas. The strength or elasticity of the envelope which confines them suddenly yielding to pressure, the liquid passes with great rapidity into vapour, violently displacing by this sudden expansion the surrounding air, and any other obstacles opposed to the expanding molecules.

Similar explosive effects, less simple in their origin, are brought about by the sudden development of chemical activity in mixtures of gases or vapours, of solids and gases, or of solids only, or in chemical compounds of unstable character, the result in all such instances being the development of intense heat, and the sudden or very rapid and great expansion of matter.

Examples of the most simple class of explosions are the sudden failure in strength at some particular point, or generally of the material composing a vessel in which a gas has either been liquefied or highly compressed. Accidental explosions of this character take place chiefly, and, happily, not very frequently, in the laboratory or lecture-room; yet instances occasionally occur of disastrous explosions resulting from such causes in manufacturing operations, or in the practical application of compressed air or other gases. The most

recent illustration of a serious accidental explosion of this kind is that which occurred in the Arsenal, at Woolwich, in January, 1874, with the air-chamber of a Whitehead, or Fish-Torpedo, when one man lost his life and several were seriously injured. In this instance some part of the soft steel diaphragm closing the chamber in which the motive power of this self-propellant torpedo (air) was imprisoned, under a pressure of about 800 lbs. on the square inch, suddenly yielded to the efforts of the gas to return to its normal condition. These air-chambers were invariably tested up to a pressure very considerably exceeding that to which they would be subjected in actual service, before they were allowed to form part of the torpedo; yet, in this instance, some comparatively weak point in the plate in question, though it had successfully resisted the force exerted by the very highly compressed air for a short period, was eventually tried beyond the limits of its strength, by the continued strain exerted by the air confined at a lower pressure; the powers of cohesion of its particles were suddenly overcome, when the confined air, released at one point, expanded with irresistible rapidity, tearing asunder the splendid metal which composed the air-chamber, and consequently inflicting fearful injuries on the poor fellows who were preparing to launch the torpedo on its trial trip. Most careful steps have been taken to avoid the recurrence of an accident of this nature, the possibility of which, with the precautions already adopted, was quite unforeseen.

Other explosions of this class, which are of more than weekly occurrence, and but too frequently result not merely in destruction of property, but in more or less serious loss of life, are due to the bursting of boilers at factories, mines, and collieries, to say nothing of those which occur in buildings, in connexion with heating appliances and with kitchen ranges, and bath or other heating arrangements. The explosion of a boiler may arise either from an exceptionally rapid development of steam, the pressure speedily exceeding that which the boiler, or some portion of it, can withstand; or from an absence, or failure in the proper operation, of appliances for relieving the pressure in a boiler, by permitting the escape of steam, and giving warning when the pressure begins to exceed the limit of safety. The suddenly tumultuous evolution of steam may either occur from the boiler becoming overheated in parts, in consequence of the shortness of water, or from the sudden cracking or peeling of a non-conducting incrustation, or fur, on some part of the boiler, whereupon the water comes into contact with the overheated metal beneath it. But by far the chief causes of boiler explosions are defects in their construction, or repair, and the reduction in thickness of the metal in parts by corrosion, or oxidation, internally and externally, from long use, and neglect of proper measures for periodically cleaning the boilers.

The accidents due directly to the deposits formed from water in boilers have been very greatly diminished of late years by the application of preparations, called boiler compositions, of which there are many varieties, their general action being to prevent, more or less effectually, the carbonate and sulphate of calcium and other impurities in water, which are separated by its ebullition and evaporation, from producing hard impenetrable crusts or coatings upon the inner surfaces of the boiler. The judicious employment of a good anti-fouling preparation, and the thorough periodical cleansing of the interior of boilers, go far to guard against that source of danger, though, in adopting measures to diminish the formation of incrustations, care must also be taken to avoid promoting internal corrosion of the boiler by the agents used.

The operations of the Manchester Steam Users Association for the prevention of steam-boiler explosions, founded, mainly through the instrumentality of Sir William Fairbairn, 20 years ago, and of which Sir Joseph Whitworth has also been a warm supporter from its commencement, appear to have gradually succeeded in very importantly reducing the annual number of boiler explosions, by introducing among its members a system of periodical independent inspection, the efficiency of which is clearly demonstrated by the circumstance that no case of explosion has yet occurred with boilers under the regular inspection of the association, while between 600 and 800 boilers are examined monthly. The periodical reports prepared by the talented chief engineer of the association, Mr. Lavington Fletcher, are full of interesting and valuable information, and throw great light upon the chief causes of boiler explosions, and the means by which they may be guarded against. The association will not allow that the term "accidental," or mysterious, is applicable to steam-boiler explosions. Mysterious they certainly are not, as they are generally quite traceable to causes which may be obviated, such as inferior material or defective construction, or local injuries, gradually developing and increasing, which would certainly be discovered before they attained dangerous dimensions, by a proper inspection; it may therefore not be too harsh to maintain that boiler explosions are not accidental, as their prevention lies in the power of the steam users, though it is true the same view must equally apply to other classes of so-called accidental explosions which are referred to in this discourse.

The following statements, furnished to the speaker by the Steam Users Association, afford some idea of the number and nature of boiler explosions which have occurred in the last few years. The number of explosions recorded annually by the association, from 1865 to 1874 inclusive, ranges from 48 to 72; the average present annual number is 50. The largest number of deaths recorded is 87, and the smallest 32, the present average number being 75. About double that number of persons are seriously injured annually. With respect to the causes of boiler explosions, 40 per cent. were due (from January, 1861, to June, 1870) to malconstruction of the boilers; 29 per cent. to "defective condition" of the boilers; 15 per cent. to the failure of seams of rivets at the bottom of externally fired boilers; 10 per cent. to overheating from shortness of water; and less than 3 per cent. to accumulation of incrustations.*

An examination into the particular nature of the services performed by boilers which have exploded shows that a considerable number of explosions have occurred at iron-works, and a very large proportion at collieries, where plain cylindrical externally-fired boilers are much used. Many of the explosions of these particular boilers arise from places which remain for a time concealed in the overlaps of the seams of rivets, defying detection, but gradually extending from one rivet-hole to another, till some sudden strain causes them to extend throughout the entire seam, the boiler splitting in two. The particular description of boiler which gave rise to the largest number of fatal accidents during the year taken as illustration (1873) was the single-flued or Cornish boiler; and it was stated by Mr. Fletcher that all these explosions must have been the result of glaring neglect, as there is no boiler safer to use when well made and properly cared for. The simple precaution of strengthening, or giving internal support to the sides of the furnace-tube of these boilers, the importance of which was demonstrated many years ago by Sir W. Fairbairn, appears to be still greatly neglected, the result being the frequent collapse of of the tube through weakness. This illustration will suffice to indicate the nature of the "defects of construction" which are fruitful of the so-called accidents with boilers. An examination of the details given in Mr. Fletcher's reports as to the cause of explosions reveals a really appalling state of things under the head of "defective condition" of the boilers. In one case the plates are described as having been reduced by corrosion in places to the thickness of paper; in another, they were "in some places not more than from 1-32nd to 1-60th of an inch thick;" in another they were reduced at the primary rent "to the thickness of a knife-edge;" in another, the plates were in some places "eaten into holes which were roughly patched by means of bolted cement patches," while many of the rivet-heads were eaten off. These are merely examples of many similar descriptions. Very few explosions in 1873 appear to have been due to the neglect of the attendants, but by far the greater number to that of the boiler owners or the makers. The ignorance or criminal neglect, or worse, which appears to be occasionally displayed in the sale, purchase, and use of second-hand boilers is illustrated by the following two examples:—A boiler which burst in December, 1873, on a rag-puller and waste dealer's premises, scalding three persons to death and injuring five others, was found to have given way on its first trial by its then owners, simply from old age and decay. At the earliest period at which its history could be traced it was purchased second-hand, and worked for five years; it was then left exposed to the weather for five years, and afterwards sold to a broker for £5, who resold it as old iron for £8. It was then sold for £18 to an engineer, who sold it to its last owners with the assurance that it was safe at a pressure of 60 or 70 lbs. to the square inch. The jury at the coroner's inquest returned a verdict of "accidental death," but "desired to express their disapprobation of the conduct of the engineer who sold the boiler as in good working order when the flue-tubes were in some places less than 1-16th of an inch thick." The other illustration is that of a large boiler, which is graphically described in a professional journal of high standing as having been worked to within an inch of its life, being only removed from its seat because it would hardly hold water. On this boiler there was a patch, more than 2 feet long, covering a crack of the same length; the patch had only six bolts, three on each side, and was made tight with a piece of old carpet smeared with white lead. Had this boiler burst, the verdict would in all probability have been, as in the other case, "accidental death," though it was worked almost to the last to 35 lbs. pressure.

The explosion early in January last of a boiler at North Shields, and of one at Sheffield, affords further illustration, if it were needed, of the fearful danger continually incurred, even by those well acquainted with the properties of iron and steel and the limits of their powers of resisting strain or pressure, in the employment of boilers long after they had ceased to be trustworthy. At Shields, at a large manufactory of chain cables and anchors, the boiler which exploded had been worked beyond a pressure of 35 lbs., while it was unsound overpatched, and quite unsafe at that pressure. Seven people were killed, and about 20 others injured, and a vast amount of property was destroyed, the buildings within 500 yards appearing as though they had been bombarded. At Sheffield, where the explosion of a boiler not many days after killed two persons, injuring several others, a leakage had been observed in the boiler some time before the explosion, but had not been repaired, and a plate fractured by the explosion had been greatly reduced in thickness by corrosion. This boiler appears to have been worked up to the day of the explosion at a pressure of from 40 to 50 lbs., and the workmen employed are stated to have expressed fear at working in its vicinity.

The foregoing and other very numerous illustrations of the appalling display of ignorance, neglect, or recklessness in dealing with the application of steam power, point strongly to the importance of legislation connected with this subject. A parliamentary committee of inquiry reported in July, 1870, that the introduction of compulsory independent inspection of boilers would interfere with the responsibility of the boiler owner; but it is somewhat difficult to realize where the responsibility lies, in the present condition of things. That a system of inspection may be made to work well has been demonstrated by the beneficial results of the now very widely applied labours of the Steam Users Association; and that Government realizes these benefits is demonstrated by the fact that the boilers at the manufacturing establishments of the War Department are subject to the inspection of the association. There can be no reason why the responsibility of the proper condition of boilers, and steam apparatus generally, should not be thrown upon inspectors, just as the proper fencing of machinery in factories, and the proper condition of steam-boilers in a passenger steam-ship, are secured by a system of responsible official inspection.

The explosions which are often recorded as occuring in kitchen ranges and in boilers used in connexion with the heating of buildings are not unfrequently attended by fatal results. Much of what has been said with regard to boiler explosions generally, applies to accidents of this class. Explosions in such boilers have repeatedly arisen from corrosion of the metal, and consequent great reduction of its thickness in places, due to the accumulation of hard incrustations or furs, which in time exclude the water from contact with the metal, causing the latter to scale from overheating. The incrustations will crack or split from time to time, in consequence of inequality of expansion or contraction between them and the metal, and if the latter be heated at the time, pressure of steam may be suddenly generated, which the worn boiler will not withstand, unless provided with an efficient safety-valve.

As the water in kitchen boilers is often used for culinary and drinking purposes, the means employed in boilers used for steam purposes only, to prevent the formation of hard deposits, cannot be resorted to; therefore the only means of guarding against accidents to domestic boilers from these causes consists in frequent and thorough cleaning out, which is especially necessary where the water supply is hard.

Explosions also occur with household boilers of the ordinary circulating class, unprovided with safety-valves, through the stop-taps of the pipes, which connect them with an overhead cistern being left closed by accident or negligence, in which case steam pressure must speedily accumulate to a dangerous extent, all outlets being closed. Accidents with such boilers are particularly liable to occur during severe frosts, in consequence of the circulating-pipes becoming plugged up with ice, whereby the outlet for steam pressure is as completely cut off as if the stop-taps were closed. Several accidents due to these two causes, some of them attended by fatal results, were recorded last year. The obvious and simple method of guarding effectually against such explosions is to have the boiler fitted with a reliable safety-valve of the most simple form; a valve of pendulous dead-weight construction is specially recommended for this purpose by the Steam Users Association as being inexpensive, certain of action, and free from any liability to get out of order. So simple a precaution for avoiding the possibility of a frightful accident surely only requires public attention being directed to it to secure its general adoption.

Explosions resulting from the ignition of mixtures of inflammable gas and air constitute even a more formidable class than that just described; for the number of explosions in coal mines which occur in a year is very considerably greater than that of boiler explosions, while the loss of life occasioned by the former is very considerable, and is occasionally appalling in its magnitude. Thus, in 1871, there were 52 fatal explosions, 268 men being killed, and 234 non-fatal explosions, by which it is estimated that 368 men were injured; and, as examples of specially calamitous explosions, may be mentioned that at Risca Colliery in 1860, when 142 men were killed, and those at Oaks Colliery in 1866, and Ferndale Colliery in 1867, when 334 and 178 men were killed.

If marsh gas, or light carburetted hydrogen, which exists imprisoned in coal-beds, and escapes into the atmosphere in the pit-working, either gradually, or sometimes under considerable pressure, becomes mixed with the air to such an extent that there are about 18 volumes of the latter to one of the gas, the mixture burns with a pale blue flame, which will surround that of a candle contained in such an atmosphere; the appearance of such a "corpse-light" round the flame of the pitman's candle or lamp-flame is a warning, too generally unheeded, of the presence of fire-damp in quantities likely to be dangerous; for if the proportion of marsh gas increases much beyond that above specified, an explosive atmosphere will be formed, the violent character of which increases as the proportion of fire-damp approaches that of one volume to ten of air. Marsh gas requires for its ignition to be brought into contact with a body raised to a white heat; fire-damp, or a mixture of marsh gas and air, is therefore not inflamed by a spark or red-hot wire, but will explode if brought into contact with flame. The fact that this contact must be of some little duration to

* These data are in part extracted from a table submitted by Mr. Fletcher to the Select Committee on Boiler Explosions, in June, 1870, *vide* p. 118 of the committee's report.

ensure the ignition of the fire-damp was applied by Stephenson in the construction of his safety-lamp; and a very philosophical application of the property possessed by good conducting bodies, such as copper or iron, of cooling down a flame below the igniting point of the gas, and thus extinguishing it, was made by Davy in the construction of his safety-lamp.

All the efforts of eminent scientific and practical men, for the better part of a century past, to diminish the number of coal-mine explosions, by improving the ventilation of the mines, and providing the miner with comparatively safe means of illumination, appear to have had very little effect in reducing the number and disastrous nature of these accidents. Since the construction of miners safety-lamps by Davy, Stephenson, and Clanny, repeated and partially successful efforts have been made to reduce the loss of light consequent upon the necessary enclosure of the flame, and thus to lessen the temptation of the miner to employ a naked flame at his work in fiery mines. Yet investigations after mine explosions still frequently disclose instances of the employment of candles where they are undoubtedly dangerous; and the regulations which have been made law with the view of preventing accidents through the use of naked lights by miners, where there appears any likelihood of fire-damp escaping and lodging, are, in many cases, either habitually neglected, or very carelessly carried out. One practice which appears to have become very general in mines where fire-damp is known to exist—that of sending firemen with safety-lamps to examine the mines, the men then proceeding to work with naked lights in all places marked as safe by those officials—is obviously a most dangerous one, the lives of many being made absolutely dependent upon the vigilance and trustworthiness of one or two; yet it appears to be one almost forced upon the managers of collieries by the men themselves, who often absolutely refuse to go to work with safety-lamps. Of the three colliery accidents which occurred between the 23rd of December and the 7th of January last, by which 28 men lost their lives, two afford sad illustrations of the fact that the overlookers and the miners themselves are chiefly to blame for the frequency of these accidents, and that the practice of employing "firemen" just referred to is a highly perilous one.

In the case of the explosion at Bignall Hill Colliery, North Staffordshire, the Government inspector gave evidence to the effect that the explosion occurred in what was admitted to be the most fiery seam in the North Staffordshire coal-field, and in which no naked light ought ever to be used. The overlooker stated that, having found gas in the heading on the morning of the explosion, he told the men not to go to work there with naked lights; that "he had authority to order lamps, but he had not done so, because he had not seen any necessity for it. The explosion might have been avoided if the man, whose light was believed to have fired the gas, had done his duty, and used a lamp." Another witness "had found gas on the morning of the explosion, but not sufficient to lead him to suspect danger. He found gas in the place after the fireman said he had cleared it away; . . . the workings always were considered safe, and if he asked a man to use a lamp, he would often be laughed at."

The Government inspector deposed that "all the circumstances went to show that the fireman did not examine the place before the men went to work, and that one of the men walked into it with a naked candle and ignited the gas." At the second explosion (at the Aldwarke Main Colliery, near Rotherham) the fire-trier appears to have made his customary inspection, and found all safe at the place where the explosion occurred, and had left his usual sign to indicate to the men that all was right. The opinion of the engineer was that a considerable fall of roof (of the working) had occurred after he had left, and that, before the liberated gas had time to be carried away by the ventilating current, the men entered and met the gas, which immediately fired. "Had there been a delay, . . . or had the men been provided with safety-lamps, the accident would in all probability have been averted." In the report of the accident, it is stated that the men in that district will rather leave a colliery than be subject to the strict enforcement of the rules of the Act passed to ensure their safety, and that some such calamity was needed to enforce proper regulations for the safe working of the mine. There can be no question that the comparatively dim light afforded even by the best constructed lamps in general use is a cause of great temptation to the men to use uncovered lights; it is, therefore, much to be hoped that continued efforts may be made to apply the electric light to the illumination of mine workings. Some approach to success in this direction was already attained ten years ago, and one cannot but have great faith in the ultimate feasibility of some portable method of illumination by electric agency.

There are, however, causes other than the use of unprotected lights, which contribute to the production of coal-mine explosions. Efficient ventilation of workings, whether in use or not, whereby all dangerous accumulation of fire-damp is avoided, and any sudden eruption of gas may be rapidly dealt with (the gas being largely diluted and swept away as speedily as possible) is indispensable to the safe working of the mine (without any reference to the health of the men) so long as there is any temptation for the use of naked lights. The original laying out of a working greatly affects the question of efficient ventilation, and explosions have been clearly traced to gas accumulations, which there was sufficient power of ventilation to reduce, if the nature of the working had admitted of its proper application. At the Bignall Hill Colliery, where the fearful explosion occurred on Christmas Eve last, the ventilation had been reported imperfect about three weeks before the accident, and the Government inspector stated that the deficient ventilation was due to the improper laying out of the work. In arranging for the efficient ventilation of a mine, ample provision for rapidly applying extra artificial ventilating power should be made; and, in connexion with this, the interesting and useful series of observations should be borne in mind, which have been made public in communications to the Royal Society and the Meteorological Society by Messrs. R. H. Scott and W. Galloway. Those gentlemen have clearly established a connexion between the occurrence of meteorological changes and colliery explosions; they have shown that explosions frequently occur at the time of considerable barometric disturbances, which must unquestionably affect the rate of diffusion of the fire-damp into air, and the rapidity of air circulation in a mine. They also point out that when the external temperature rises very considerably, the natural ventilation, due to the higher temperature of the air in a mine, is liable to cease, by the external atmospheric temperature becoming equal to, or perhaps exceeding, that in the mine. They consider that of 233 explosions which occurred in 1872, 58 per cent. were due to disturbances of atmospheric pressure, and 16 per cent. to excessive heat of the weather, and they have similarly traced the proportion in which the same meteorological changes have contributed to bring about explosions in other years.*

* Reference must be made here to an ingenious application, made by Mr. Ansell, of the laws of diffusion and osmose for detecting the presence of fire-damp in coal-pits. Two or three forms have been given by Mr. Ansell to the detector apparatus; perhaps the most simple consists of a ball of thin india-rubber, filled with air and fixed upon a stand under a lever, which slightly presses the upper surface of the ball. If from any cause the lever is raised, it liberates a spring which sets a bell in vibration, or brings an electro-magnetic alarum arrangement into operation. If this apparatus is placed where fire-damp exists to an important extent, the light carburetted hydrogen passes through the pores of the india-rubber ball, and as the air in the latter passes outwards at a much lower rate, the ball soon distends, exerting sufficient pressure on the lever to bring into action the signalling arrangement, which, if electric, may be placed at any convenient distance from the fire-damp detector, being connected with the lever by means of conducting wires. It would appear as though a detector of this nature could be made of important service in fiery mines, but its employment does not seem as yet to have passed beyond the experimental stage.

Since the employment of gunpowder as a means of rapidly removing coal, or overlying shale, has come into considerable use, there can be no question that an additional and a very serious source of danger has been imported into the working of collieries. That the explosion of a charge of powder in a blast-hole, or the "firing of a shot," has by no means unfrequently resulted in the production of a fire-damp explosion, has been clearly established by careful inquiry. This has been ascribed to two causes, one of them the direct ignition of the explosive gas mixture by the flame from the shot, the other the dislodgment of fire-damp from cavities or disused workings by the concussion produced, and its ignition by some naked flame or defective lamp in the neighbourhood. If a shot takes effect properly (*i.e.*, if the force is fully expended in breaking the coal or rock at the seat of the charge), there is seldom flame produced; but if the tamping which confines the charge in the blast-hole is simply blown out of the latter like a shot from a gun (which not unfrequently occurs when the rock is very hard or the tamping is not sufficiently firm, or when the charge of powder is excessive), the powder gas issuing from the blast-hole will produce a flash of fire as obtained with a gun; and if the fire-damp were in the immediate neighbourhood, it would no doubt be ignited thereby. But this combination of conditions is not likely frequently to occur; the second cause above given is therefore more likely to be fruitful of accidents; but the existence of a third cause, to which the majority of explosions connected with blasting in collieries is most probably ascribable, has been very clearly established by the careful inquiries, sound reasoning, and ingenious experiments of Mr. W. Galloway, inspector of mines. The fact has long been known that if an explosive gas mixture be driven, in a current of sufficient force, through the gauze of a safety-lamp at right angles to the lamp, flame may be forced through the meshes, and may thus ignite the explosive mixture outside the lamp; but Mr. Galloway conceived, and has clearly established by experiments in the laboratory and in coal-pits, that the sound wave established by the firing of a shot (especially by the sharp explosion produced when the tamping is shot out of a hole) will by transmission even to very considerable distances, having the effect of forcing flame through the meshes of the gauze of a safety-lamp, and will thus lead to the ignition of an explosive gas mixture surrounding the latter. Safety-lamps may frequently be accidentally surrounded by (or purposely introduced, for purposes of inspection, into) an explosive atmosphere at the time that shots are fired in neighbouring workings; and the circumstantial evidence collected after the occurrence of some explosions has undoubtedly indicated that this is the most probable explanation of the cause of the accident. It is probably not to be expected that even in fiery coal-pits miners will forego the advantages derivable from the employment of gunpowder, and it appears next to impossible to enforce prohibitory regulations with respect to such pits; but it may perhaps, at any rate, be hoped that the miner may be trained to a knowledge of the danger he incurs by the incautious use of gunpowder, although the persistent recklessness with which he sacrifices safety to comfort, in despising the use of the safety-lamp, forbids sanguine expectations in this direction.

Reference has not been made to another very possible source of accidents, due to the employment of gunpowder for blasting purposes—namely, carelessness in the keeping and handling of the explosive agent by the men. Personal observation by the speaker of the reckless manner in which powder is frequently dealt with in mines, leads him to believe that this contributes its quota as a cause of colliery explosions.

(To be continued.)

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade continues quiet, and as a consequence there are now a number of blast-furnaces idle in the district. Messrs. John Brown and Company, Limited, of the Atlas Iron and Steel Works, Sheffield, have two out of three furnaces at work, chiefly for the purpose of producing spiegel iron from manganiferous ores. The spiegel is of course used for the production of Bessemer steel. Messrs. W. Cooke and Company, Limited, of the Tinsley Iron-Works, near Sheffield, have one of their two furnaces in operation on the North and Mid Lincolnshire ores, as well as ironstone from Nothamptonshire. The same is the case at the neighbouring establishment of the Charlton Iron-Works Company, who are, however, chiefly using ironstone from their own mines in Northamptonshire, the result showing that it contains about 35 per cent. of the pure iron. At Parkgate, part only of the furnaces are going on the same descriptions of ores and stone. A similar state of things obtains at other works in the neighbourhood, those within the borders of Derbyshire being, perhaps, the best employed. Ordinary Derbyshire pig iron is on offer at about £3 10s. to £3 15s. per ton, large lots being obtainable at the lower price. Cleveland agents are steady at the undernoted quotations:—No. 1 foundry, 63s.; No. 2 foundry, 61s.; No. 3 foundry, 58s. 6d.; No. 4 foundry, 57s.; No. 4 forge, grey, 56s.; No. 5 forge, mottled, 55s.; No. 6 forge, white, 53s. 6d.; refined metal, 77s.; Kentledge, 65s.; and cinder pig 44s. per ton. There is very little doing in merchant iron, but, despite what has transpired during the week in connexion with the Staffordshire and Birmingham quarterly meetings, producers are decidedly inclined to accept less money than they have done up to the present time.

The chief foundry establishments are still pretty fairly employed on gas and water pipes, with the attendant irregular castings, colliery and machine castings, and certain special kinds of foundry work.

The coal trade is quiet at clearly weaker quotations. Steam coal is fully 1s. per ton easier than it was a month back, and small manufacturing coal can be bought at almost any price between 3s. and 5s. per ton. Best local coal is, of course, comparatively speaking, steady at about 11s. 6d. to 11s. per ton.

I do not, at present, learn that the Coke Producers Association, or any individual coke maker, has officially lowered prices, but it will not be a matter for much surprise should all kinds of fuel become quotably cheaper during the ensuing week or ten days.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The principal quarterly meeting of the iron and coal trades of South Staffordshire and East Worcestershire was held in the town-hall, Birmingham, on Thursday last, and was very numerously attended; but, owing to the uncertainty as the course of prices, business was at first much restricted, but later in the day, when it became generally understood that no alteration would be made, a somewhat better tone prevailed; some fair orders were distributed, though business was far from active. The leading firms who are reported to be moderately well off for orders are very firm in their quotations, but the makers of second qualities of finished iron are, in some instances, making slight concessions to tempt buyers to place specifications, which it is probable would otherwise be still withheld. Quotations are, therefore, for pig iron, £5 per ton for hot blast; £6 for cold blast; gray forge, £4; and cinder pig, £3; at which prices a moderate business is being done. In the finished iron department prices remain on the basis of £11 per ton for best marked bars. Marked bars, however, of good medium hands, may be had as low as £10 per ton; sheets are quoted £12 to £14; hoops, £11; nail rods, £9s. 10s.; strip, £10 15s. Best sheets of the well-known Wilden brand are quoted as follows:—For singles, B, £18; BB, £19; BBB, £20 10s.; B charcoal, £29 10s.; EB charcoal, £29 10s.; but in finished iron there is not much business doing, and few of the mills are in full production. The principal demand is for hoop, sheets, and plates; sheets for galvanized roofing purposes still command considerable inquiry.

The labour dispute in the tube trade at Wednesbury has happily terminated, the following terms proposed by the operatives having been accepted by Mr. Smith, the general manager of the Crown Tube-Works, the strike is virtually at an end. The terms are these—viz.: "That nine hours a day shall constitute a day's work pure and simple; that overtime shall be abolished as a standing regulation; but that if, owing to a pressure of work, it should be needed, then a separate arrangement shall be made between the men and the foremen, each to use his own discretion as to terms."

It is expected that the men will now return to work at once. During the continuance of the strike, something like £2000 has been distributed to the men.

The coal market is unchanged; on the Dudley side of the district, thick coal is firm at 18s. per ton, and seconds 13s.; but on the conclusion of the South Wales strike, of which there are now hopeful signs, a drop is expected. On the Wolverhampton side of the district prices are easier, and business is much restricted.

At the Cannock Chase, the best household qualities continue to command a steady inquiry, but the commoner qualities are pressed for sale.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of this district is gradually becoming quieter, but still there is, as yet, no great pressure to sell the better classes of coal, which, in the Manchester market, continue very steady in price, the house coal trade being exceptionally good for the time of the year. The poorer classes of fuel are, however, weaker in price, and, generally, in common coal and the inferior descriptions of burgy and slack the market is depressed, coalowners being anxious to sell at reduced rates. Stocks, however, are not increasing to any material extent, as colliery proprietors are not getting so much common coal as they were, and the good classes are being generally well cleared off.

The gas coal trade continues steady, although colliery proprietors are still chiefly engaged working off old contracts, but a few inquiries for contracts over the forthcoming 12 months are now in the market. In the West Lancashire districts the average pit quotations for screened gas coal are about 13s. to 13s. 6d. per ton; unscreened, 11s. to 11s. 6d., and ordinary gas coal, 29s. to 30s. per ton.

So far as the men are concerned, they are generally reported to be working very steadily, and as yet there is no general indication of the downward movement in wages, which is inevitable before the year is very much further advanced. But in the Oldham and neighbouring district a movement is again on foot for a further reduction of wages, as the local colliery proprietors are now being undersold by coalowners in outside districts, who are sending large quantities of coal into the neighbourhood. A meeting of the masters has already been held to consider the advisability of making a reduction of 10 per cent., but the proceedings were adjourned without any definite decision being come to.

In the iron trade there is still very little doing, but it is expected, seeing that there has been no reduction at the quarterly meetings, that there will be some business stirring in the course of a week or two. Prices for pig and bar iron are about the same as last quoted, but for good orders there seems to be some disposition on the part of makers to accept rather less than list rates. The list prices for Middlesbrough pig iron, delivered in the Manchester district, are as under:—No. 3 foundry, 67s. 3d.; No. 4 foundry, 65s. 9d.; and No. 4 forge, 64s. 9d. per ton for prompt delivery, with a little less for delivery over the next three months. Bars, delivered, are quoted at £8 15s. to £8 17s. 6d.; angle iron about the same; light rails, £7 15s. to £8; heavy ditto, 15s. per ton less.

The local iron-works seem to be getting a little better off for orders, but still they have not enough to keep them fully employed.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

With the exception of household coals, which are down 1s. per ton upon quoted rates, business was tolerably active in the coal trade of the Tyne and Wear last week. There was an abundance of tonnage of all sorts, which was in excess of the requirements of trade. Freights were weaker in the London trade, with a difficulty in fixing ships. They were down 10s. per keel in the French trade, and about 1s. per ton in the English Channel and east coast trades. Considerable quantities of steam, gas, and manufacturing coals and coke were shipped on the Tyne last week. The present price of gas coals will average from 9s. 6d. to 10s. per ton, less 2½ per cent. Manufacturing coals continue to be in tolerably improved demand, and a steady business has set in for the best sorts of steam coal. The labour question is tolerably well settled in the Durham and Northumberland collieries, but there is a misunderstanding amongst the coke-burners, who are discontented with a recent reduction of wages, and there is likely to be some trouble with them.

The quarterly meeting of the North of England iron trade was held last week in Middlesbrough. Business, on the whole, seemed rather restricted, owing to the indifference of makers of pig metal in selling their produce. The finished iron manufacturers also indicate that their chances of work have improved, and that in the ensuing quarter a fair amount of business may be expected to be done. Some orders have come in from New Zealand and other distant markets.

The difficulties in the chemical trade have been settled by the award made by Mr. Brassey, M.P., the umpire chosen by the arbitrators to decide the points in dispute. The reduction of wages is equal to about 10 per cent., which is admitted on all sides to be a tolerably fair arrangement. Mr. Brassey recommends the establishment of a court of arbitration and conciliation in the chemical trade. It is very much needed, for, notwithstanding the decision of Mr. Brassey, there was a difficulty in getting some of the men to understand the bearings of his decision, and the ball-furnace men employed at Messrs. Burnett and Co.'s turned out last week on strike upon their own account. The chemical trade of the North of England, upon the whole, is better than it was a month ago, but there was a slight falling off of business in the latter part of last week.

The appointment of a Royal Commission to inquire into the spontaneous combustion of coals, and the destruction of shipping in the eastern seas, on their voyages out from Great Britain, is likely to have a considerable interest for the gas trade generally. Most of the cargoes of coals that have been destroyed have been gas. Some north country gas coals are extremely fiery, and are a source of great anxiety to masters of vessels until they get them delivered. Indeed, within recent years, two or three steamers have been sunk off the coast of England, and entirely destroyed through explosions of gas coals. Some scientific method of ventilating ships holds carrying gas coals is absolutely requisite, and at present the rate of insurance is so high for vessels carrying certain classes of coals to the East Indies, that it is almost prohibitive.

Mr. Arnold, from the Local Government Office, held an inquiry at Cowpen, in the Northumberland district, on Thursday, into the water supply of that place. The scheme of supplying the pit villages and towns in the south-eastern division of Northumberland, from the Rothbury Hills, by the East Northumberland Water Company, having fallen through, the local boards of such places as Bedlington, Cowpen, Newsham, and Blyth are setting about improving their local supply which is likely, however, to be very inadequate, unless a large scheme is carried out by a company similar to the East Northumberland.

The Corporations of Newcastle and Gateshead, at their meetings held on Wednesday, seemed to virtually abandon their scheme for purchasing the Newcastle and Gateshead Water Company. The public are not likely to hear anything more about it. The South Shields Gas Company are extending their operations in the densely populated neighbourhoods of Jarrow and Hebburn, and the plant is being greatly improved and extended to meet the increasing demands of a large and growing population.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

At the ordinary monthly meeting of the Dundee Gas Commission, held last Wednesday, it was announced that the amount of coal carbonized during February was 2652 tons, and that the amount of gas made during January was 29,130,500 cubic feet. At the same meeting Professor Brazier's report upon the illuminating power and the purity of the gas supplied during December, 1874, and February and March, 1875, was submitted. The mean illuminating power during those months was respectively 30·31, 29·90, and 29·99 standard candles. The gas was very free from the ordinary impurities of ammonia, sulphuretted hydrogen, and carbonic acid gas; at most only traces of ammonia were detected.

At the last meting of the Town Council of Irvine, it was reported that the gas company were considering the making of a reduction in the price of gas and a modification of the meter-rate, both to come into operation next month.

Sir Wyndham Anstruther's "Burghs and Populous Places Gas Supply (Scotland) Bill" was under the consideration of the Convention of Royal Burghs at their annual meeting in Edinburgh last Tuesday, and, after being explained at some length, it was remitted to the Annual Committee, with power to petition in its favour.

Another gas managership has just been filled up. I allude to that of Alyth, the choice of the gas company being Mr. Hunter, who has for some time been assistant manager at Forfar.

The water supply question is exciting a good deal of attention in the town of Inverurie, in Aberdeenshire. The opposition to the Busby Water Company's bill on the part of the Duke of Abercorn and other proprietors of lands and mills on the river Cart has been withdrawn, owing to the company consenting to the adjustment of some of the clauses A recent inspection of the house fittings in Wallacetown and Newton-on-Ayr has revealed a great amount of waste of water. An inspection in the town of Ayr proper is to be made, and it is expected that the actual available supply will be materially increased. The largest of the cast-iron valves required for the Loch of Lintrathen (Dundee Water-Works) has arrived at Alyth station. It is a very ponderous piece of work, and weighs about three tons.

At the meeting of the Kilmarnock Town Council, on Wednesday evening, the Parliamentary Bills Committee reported that the agreement entered into with the directors of the water company on the 19th of February last had been violated, in respect that clause 47 of the Act of 1866 was re-enacted, it being provided that this clause should be repealed upon the completion of the works authorized by the bill, and, in any event, upon the expiration of four years from the passing of the bill. The committee had written to Mr. Harrison, M.P., with the view of getting that portion of the clause objected to deleted, and requested powers to instruct counsel to oppose the bill, for the protection of the public interest. The agreement in question was to the effect "that during the progress of the bill through Parliament, no clause shall be introduced into the bill altering the present relation of the water company to the public with regard to the company being bound to give a constant supply of water." A letter was read from ex-Provost Dickie, one of the directors of the company, expressing regret at what had taken place, and repudiating all connexion with it. The recommendation of the committee was unanimously agreed to, much indignation being expressed at the conduct of the company, which was freely characterized as a trick.

The Glasgow Corporation Water Committee are advertising for tenders for 400 tons of cast-iron pipes. Messrs. R. Laidlaw and Son, Glasgow, have been successful in securing the contract to supply the cast-iron pipes for the Moorfoot Water-Works (Edinburgh and District Water Trust), the amount of the contract being upwards of £40,000. The Town Council of Ayr have accepted the offer of Messrs. A. Kenneth and Son for the supply of drainage-pipes for the Newton and Wallacetown districts, at a cost of fully £900.

There was submitted to the Edinburgh and District Water Trust, on Thursday last, a report from the engineers as to the difficulties which have occurred in connexion with the embankment for the proposed Edgelaw reservoir. It appeared that Messrs. Leslie have not yet satisfied themselves as to the new site which has been suggested, and they were instructed to continue their borings, with the view of arriving at absolute certainty. At the same time it was resolved that the engineers, after having satisfactorily disposed of the Edgelaw matter, should make borings and surveys for the purpose of determining the site of a reservoir on the South Esk, below Gladhouse, which there is some talk of obtaining powers for in the next session of Parliament.

During the past week the price of pig iron has still further declined, some of the makers special brands being reduced 2s. or 2s. 6d. per ton, and warrants ranging between 69s. 6d. and 70s. towards the close of the week.

Miners wages are now to be reduced 1s. per day all round, notices having been issued to that effect. It is not likely that there will be any general resistance by the men, and it is just possible that the demand for coal may be stimulated to some extent.

THE REITHMANN GAS-ENGINE.—This engine consists essentially in a cylinder having two pistons, the space between which varies in the course of the stroke. The up-stroke is obtained by the explosion of a mixture of illuminating gas and atmospheric air, as in the Lenoir and Otto-Langen engines. During the up-stroke the back piston approaches the front one, compressing the air in the space between them. The down-stroke is effected by the detention of this air, combined with a lowering of the pressure produced in the hinder portion of the cylinder by the condensation of the gases liberated in the explosion and the cooling of the illuminating gas, such condensation and cooling being effected by a current of cold water circulating in the casing of the cylinder. In the Otto-Langen engine there is only one piston, the cylinder being open at one of its extremities. According to a communication made by Professor Linde to the Polytechnic Association at Munich, it appears, from a theoretical comparison of the two engines, and an examination of the diagrams, that the Reithmann engine furnishes per stroke a lower motive power than the Otto-Langen engine. The heat evolved during the compression of the air in the former engine is, besides, not entirely given back in mechanical work during the detention of the air, a part of this heat being transmitted, for no useful purpose, to the cold water in the cylinder casing. The advantages of the Reithmann engine consist in the uniformity of its movements and in its well-understood arrangement.

WATERFORD GAS COMPANY.—The following is the report of the directors for the half year ending at Christmas last:—"The contract for the public lighting of the city of Waterford having expired on the 31st of August last, negotiations were entered into with the corporation, on behalf of your board, for a renewal of same; but the price offered by the corporation being such as the directors could not, in justice to the shareholders, accede to, and the corporation not being willing to make any advance on their original offer, your directors are proceeding to have a decision on the dispute, under the arbitration clauses of their Act. Your directors refer to these facts for the purpose of explaining the entry, at the corporation side of the account, as estimated amount of public lighting from September 1st to December 31st. The balance to credit of the revenue account is £674 10s. 4d., out of this the directors recommend the usual dividend at the rate of 8 per cent. per annum, which, amounting to £640, will

leave £34 10s. 4d. to be carried over to next account. The Corporation of Waterford have this session promoted a bill in Parliament, seeking power, amongst other things, for the purchase of your company's works. The terms proposed in the bill being such as did not meet the approval of your directors, they have lodged a 'watching' petition against it, with the view of protecting your interests, and preventing your rights being interfered with. Since the foregoing report was signed, the Lord Chancellor has granted an injunction against the corporation applying their funds to the promotion of the bill in question. This step will, in all likelihood interfere with the prosecution of the bill."

FOREIGN SHIPMENTS OF GAS AND WATER PIPES, COAL PRODUCTS, &c.—The following shipments from Scotch ports have been reported within the past two weeks:—To Halifax—coal products, £24; coal tar, £10. To Havannah—cast-iron retorts, 38 tons, £193. To St. John's, Newfoundland—coal tar, £22, £28, and £41 To Bombay—cast-iron pipes and fittings, 39 tons 2 cwts. 17 lbs., £405; other pipes, 73 tons 13½ cwts. 18 lbs., £560; fire-bricks, 47 tons 15 cwts., £59. To Antwerp—cast-iron pipes, 10 tons 3 cwts., £110; fire-bricks, 97 cwts., £4; malleable iron tubes, 52 tons 7 cwts., £550. To Bordeaux—coal-tar pitch, 81 tons 8½ cwts., £132; malleable iron tubes, 6 tons 12 cwts., £150. To Singapore—cast-iron pipes, 430 tons 14 cwts., £3185; fire-bricks, 17 tons 2 cwts., £17. To Calcutta—fire-bricks, 100 tons, £93; malleable iron tubes and fittings, 6 tons 2 cwts., £140; cast-iron pipes and connexions, 66 tons, £442 To Rotterdam—fire-clay pipes, £75. To Hamburg—benzole, 14 drums; coal tar, 850 barrels. To Rio de Janeiro—malleable iron tubes, 2 tons 1 cwt., £60. To Dunkirk—malleable iron tubes and fittings, 11 tons 19½ cwts., £233. To San Francisco—fire-bricks, 22 tons 11 cwts., £32. To Demerara—fire-bricks, 200 tons, £120 To Cape Town—cast-iron pipes, 5 tons. To Montreal—malleable iron tubes, 2 tons. To Genoa—cast-iron pipes, 97 tons; malleable iron tubes and fittings, 41½ tons.

WAKEFIELD WATER-WORKS COMPANY.—An extraordinary meeting of shareholders was held on the 6th inst., for the purpose of empowering the directors to borrow £7500 on mortgage, and to consider the present position of the company. Mr. W. Statter, the chairman, explained that the directors had been compelled to withdraw from Parliament their bill, asking for powers to obtain a supply of water from Holmfirth, because the proprietors of the reservoirs there had refused to sign the agreement come to between them and the company. The £7500 was required in order to pay off some claims against the company, and to provide new filtering-beds, which, it was expected, would cost nearly £3000. A resolution empowering the directors to borrow the money was unanimously passed. A long and interesting discussion followed with regard to the present position of the company. The chairman said the company were still supplying the public with water from the river Calder, and as they had, during their application to Parliament for a new supply, strongly condemned that source, and the public were prejudiced against it, they would be compelled to secure another supply. After much deliberation the directors had agreed upon a scheme which they believed would be most remunerative, but, at present, they did not consider it would be prudent to enter into details with regard to it. The chairman concluded by proposing a resolution to the effect that, in the opinion of the meeting, it was important and necessary for the interests of the company that a new supply should be obtained, and authorizing and empowering the directors to take all necessary steps in the matter. The motion was carried.

TOWN DRAINAGE.—On Wednesday evening last, at the meeting of the Society of Arts, Mr. Hawksley, C.E., in the chair, a paper was read by Mr. Adam Scott, on Captain Liernur's improved system of town drainage, now in use in parts of Amsterdam and other towns in Holland, and in several towns in Austria. By this system the excrementa and such refuse are removed by pneumatic pressure. The town is divided into districts of from 200 to 1000 acres, according to local circumstances, each such district being again divided into small drainage areas, and each area is provided with one air-tight cast-iron tank placed at a convenient spot where two or more streets meet, and about 3 feet under the pavement. From the tank along the several streets extend air-tight cast-iron main-pipes connected by branches with the closets of the houses. A vacuum is created in the tank, and fœcal matter is sucked into the tank and from the tank again by a similar process into a central station. The matter collected at the central reservoir is converted into *poudrette*, and sold for agricultural purposes; but this part of the system, it was stated, has not yet been tested on a large scale. A discussion followed, in the course of which Mr. Rawlinson said he did not think the system would ever be extensively adopted in this country, on account of its complexity and cost, and if it were adopted it would not decrease the pollution of the rivers by one iota. Dr. Buchanan and Mr. Flynn, who had examined into the working of the system in Amsterdam and Leyden, said both the officials and the inhabitants spoke favourably of it. In Leyden it was stated the excrementa was sold at the rate of 2s. 6d. per head of the population.

SANDWICH GAS COMPANY.—The yearly meeting of the shareholders of this company was held on Tuesday, April 6th, for the purpose of declaring a dividend and receiving the report of the directors. Mr. Thomas Dorman, the secretary to the company, read the notice convening the meeting, also the report of the directors, and the balance-sheet. The chairman moved the adoption of the report, congratulating the shareholders on the present prosperous state of the company, remarking that their balance-sheet was now a good one, and free from several items of an objectionable character which had hitherto held a place in it; at the same time the directors were enabled to recommend a respectable dividend at the rate of 5½ per cent., or 11s. per share; this might have been with propriety increased, but the directors, bearing in mind the fact that the price of gas was again reduced, and some outlay needed, they did not wish to part with the whole of their available funds until certain of the result. The works were now in better condition than they had been for years, and the prospects of the company were of a most hopeful kind. Of course, the shareholders were well aware that they were entirely indebted to their engineer, Mr. W. A. Valon, for their present prosperous condition, who had, by his ability and energy, in less than two years reduced the price of gas 2s. 6d. per 1000 feet to the consumers, and at the same time paid the shareholders a dividend, a thing they were entirely without when they first called that gentleman to their assistance. He then formally moved the adoption of the report, which was agreed to. The usual vote of thanks to the chairman and officers of the company closed the proceedings, which were throughout of a most cordial nature.

MANUFACTURE OF ARTIFICIAL ALIZARINE.—The following is the process employed in the manufacture of artificial alizarine, as conducted in the important works of Meister, Lucius, and Brünig, at Frankfort-on-the-Main. A certain quantity of anthracene, having its fusion point between 207° and 210° Cent., is heated for three hours in earthenware or enamelled iron vessels, together with one-fourth of its weight of bichromate of potash, and twelve parts of nitric acid having a specific gravity of 1·05. The crude anthraquinone obtained is dissolved in six parts of boiling nitric acid, of a density of 1·5. The solution is complete when, on cooling, anthraquinone ceases to be deposited. The solution then contains mononitrated anthraquinone, which is precipitated with water, and dissolved in from nine to twelve parts of a solution of caustic soda of from 1·3 to 1·4 sp. gr., heated to a temperature of from 170° to 200° Cent. This heating is discontinued when a sample of the liquid no longer gives an augmentation of precipitate with hydrochloric acid. The mass is then allowed to cool, when it is dissolved in boiling water, filtered, and the colouring matter precipitated in the warm solution by means of an acid. After washing, the yellow-brown precipitate is ready for immediate use in dyeing operations. The residuum remaining upon the filter consists principally of anthraquinone, which is recovered in manufacture. The manufacture of artificial alizarine is daily acquiring greater development. In Germany, in the year 1873, the production reached to 900,000 kilogrammes (nearly 884 tons) of alizarine paste, containing a mean of 10 per cent. It may be presumed that in a few years the product of madder will be advantageously replaced by this derivative of coal tar, and that the land now occupied in the cultivation of the madder plant will be appropriated to other agricultural uses.

COAL-CUTTING BY MACHINERY.—In coal mining, as in the other great departments of national industry, engineering skill has been strenuously endeavouring for a long period of years to find a substitute for manual labour, or to supplement it by such mechanical contrivances as would perform the work more efficiently, cheaply, and expeditiously. Of the various machines which have from time to time been tried in the northern coal-field, the major portion of them have been abandoned on being found to be impracticable, and North Hetton and South Hetton Collieries possess the only one, we believe, in actual working in this district. At West Rainton, however, last week, was tried a coal-cutter of comparatively recent invention, which promises to greatly exceed in its result many of its competitors; and its result at that colliery, if sustained, will probably lead to its general introduction to the district. Having arrived at the shaft mouth, attention was first directed to the engine there stationed for the purpose of providing motive power to the coal-cutter, by forcing compressed air through a service of pipes laid down the shaft, and through the workings of the mine. We then entered the cage, which, with a gentle and not unpleasant motion, speedily dropped us down 80 fathoms into the bowels of the earth. The cutter, under the charge of three men, was placed at a corner in the face, and having been started, the disc speedily worked itself out of sight in the coal strata. The revolving cutter works in the bottom of the seam, in the bottom stone and coal, and curves in to a distance of from 3ft. to 3ft. 4in., the part actually worked out being from 3in. to 4in. in thickness. From the space cut it effectually sweeps out, as it revolves, all the bottom stone and coal, and this being inferior is thrown back into the goaf, while there remains for subsequent removal a seam of good coal about 3ft. 2in. in thickness. In one hour 18½ yards of the face was kirved. The pressure of compressed air was about 27lb. or 28lb., and the machine continued its work during the time without hitch or stoppage of any kind. Nothing could be more satisfactory than the operation of the machine at the trial, and the colliery viewers who, from their daily experience of the coal-cutter, are the best judges of its efficiency, expressed themselves as fully convinced of its practical success. It is found that the per centage of round in machine-hewed coal is considerably greater than it is with hand-hewed coal. To put the matter succinctly, we may state that out of every 100 tons of hand-hewed coal, 50 or 51 tons only of round are obtained, the remaining 49 or 50 tons being small. Now, of 100 tons of coal cut by the machine at this colliery, from 75 to 77 tons are round, and the remainder small.—*Sunderland Times.*

THE SALFORD TOWN COUNCIL AND THE BARTON LOCAL BOARD.—At a meeting of the Salford Town Council on the 7th inst., the minutes of the Gas Committee showed that at their meeting on the 24th of March, the town-clerk produced a copy of the evidence adduced before the House of Commons committee on the Barton Gas Bill, and read a portion of the evidence given by Mr. William Tice, of Worsley, on behalf of the promoters of the bill. He also read a letter which had been received from Mr. Tice, in the course of which he said: "The Barton Gas Bill case having ended, I hasten to apologize to your corporation and the Gas Committee for the liberty I took, as stated in my evidence before the parliamentary committee, in drilling and tapping the gas-mains without their consent, which I certainly could not have expected to obtain under the circumstances. I need not say that I had no other object in view than to obtain information for the promoters of the bill, and I can assure you that no injury has been done to the pipes, they having been securely plugged, and that the smallest possible amount of loss of gas took place while making the experiment." The committee upon this had passed a resolution accepting the apology. Alderman Tysoe desired to make an explanation upon this matter. He said the committee did not suppose that Tice would have done this without the consent of the Barton Local Board. The corporation had in their proceedings with the board behaved in the most straightforward and open manner, and had afforded the board any information which they could. They were therefore surprised to find that this underhand, sneaking sort of policy had been adopted on the other side. They felt very indignant, and no doubt if they could have decided while they were in London, some very strong proceedings would have been taken. When, however, they came down to Manchester they found this apology, and they considered that if it were made public it would be sufficient to vindicate the dignity of the corporation, and that it would not be worth their while to take any proceedings against this man. With reference to the promotion of the gas bill, he added, the corporation of course would have seen the result of the proceedings in reference to the foolish and absurd scheme of the Barton Local Board. The board must have been very ill advised, for the attempt they had made was unprecedented excepting in one instance, where an attempt was made to obtain power to construct gas-works at Partick, near Glasgow, which was also a failure. Before the Barton Bill was before the House of Commons, the board had only complained of the price that was charged by the corporation for the gas; but in support of the bill complaints were made of the quality and pressure of the gas, and of many other things. The committee, however, set aside one point after another, and told the counsel for the corporation that there was no occasion to argue upon these matters. Eventually, as the corporation knew, the committee considered that the preamble of the bill had not been proved. He could only express his regret that the Barton Board, by all these ill-advised proceedings, had thrown away not only a large amount of their own money, but a large amount of the money of the ratepayers of Salford. If the board had approached the Corporation of Salford in a proper manner in the first instance, they could have obtained everything they wanted. At all events, they would have been in a better position than they were in now, because when the question of a reduction in price came before the committee again, they would have to consider the cost they had been put to in this matter. The corporation intended, however, to replace their mains, and there was no doubt the outlying districts would have an ample supply of gas for many years to come.

Register of New Patents.

2571.—CLARK, F.W., Hackney, Middlesex, "*Improved apparatus for generating carburetted hydrogen gas.*" Patent dated July 22, 1874.

This invention relates to that class of apparatus in which carburetted hydrogen gas is generated from a liquid hydrocarbon with the admixture of certain proportions of atmospheric air.

In carrying out the invention, the liquid hydrocarbon is contained in a close vessel placed at any convenient altitude, so that the liquid by its gravity will flow into the apparatus. This vessel is divided by a vertical partition into two compartments, in one of which is placed the new hydrocarbon liquid, while into the other is pumped up the heavy or refuse liquid which remains at the bottom of the gas-generating apparatus, when some of the lighter parts have been removed by the distilling or gas-generating process. Supposing that the apparatus has been already at work, and that some of the refuse oil has been pumped up into its compartments in the reservoir above, a regulated quantity of this refuse oil is allowed to run from the reservoir into a retort or heating vessel, in

which is enclosed a double coil of pipe, heated by a burner placed there for the purpose, and into one of these coils the oil or the gas, already generated therefrom by the heat of the apparatus, enters; and after being highly heated, passes off at top through a pipe, which conducts it in the form of a jet to a small spherical or pear-shaped chamber, to which heated air is admitted. The exit aperture or nozzle of the gas-pipe is capable of adjustment, so that the gas may be made to suck or draw in with it a regular quantity of air. The compound or mixed gases in a heated state are driven forward in a pipe, surrounded by another pipe of larger dimensions, so as to leave an air space around the hot gas-pipe. By this means the ascending air is heated by abstracting the caloric from, and thereby cooling, the descending gas. The air thus heated is used for mixing with the hot gas in the manner already explained, and the mixed gases are conducted to a chamber at the bottom of the generating apparatus, which, as well as the chambers immediately above it, is divided into two compartments by a vertical partition. From this chamber the gas passes through a horizontal metal screen, and through another chamber or chambers filled with wood, cork, tow, cotton waste, or other material, which will arrest any solid matters or undecomposed liquid, which will be allowed to drain off and run into the lowest compartment of the apparatus, from which it is pumped up again into the reservoir above. When the gas has passed through the screens and the mass of wool, it ascends through vertical tubes into an inverted bell or vessel resembling a gasholder. The varying pressure of the gas in this vessel will serve to raise and lower it, and through the medium of suitable arms open or close cocks on the tubes for supplying the liquid hydrocarbon from the vessel above. By this means the quantity of the liquid supplied will be regulated by the consumption of the gas. The mixed gas in the inverted bell will descend therefrom down a second series of vertical tubes, and will pass a second time through the perforated screens and the mass of wool contained in the chambers, but on the opposite side of the vertical partition which divides the chambers into two parts. On the opposite side of the apparatus is a precisely similar arrangement of pipes, tubes, and valves, and the fresh hydrocarbon liquid from the reservoir above is conducted to the second coil of tubes in the retort or generator, where it is vaporised and conducted by pipes to a second spherical or pear-shaped vessel, where it will be mixed with the poor gas that has been made from the refuse oil. This poor gas will thereby become supercarburetted, and the mixed gas will, therefore, possess a high power of illumination. They may then be conducted to a gasholder.

2587.—AITKEN, H., Falkirk, N.B., "*Improvements in the manufacture of illuminating gas, and in the apparatus or means employed therefor.*" Patent dated July 24, 1874.

This invention, which relates to improvements in the manufacture of illuminating gas, has for its object to enhance the illuminating power of the gases obtained by the destructive distillation of coal and other substances. This object is effected by improved methods or means of treating the crude gases, whereby they are enabled to retain, or to be saturated with, the volatile hydrocarbon vapours and rich gases, which by the ordinary methods of making illuminating gas are absorbed by, or carried off in, the tar and the aqueous vapours. By the present invention the injurious action both of the tar and the aqueous vapours is prevented.

Under the first mode of carrying out this invention the condensers and scrubbers are arranged so that the tars as they are condensed or separated from the gases flow back towards the hydraulic main before passing into the tar-tank, and thus the volatile hydrocarbons absorbed by the tars are revolatilized by the current of heated gases, and are conveyed with them to the condensers, where part of the vapours are again absorbed and condensed, the more volatile portions passing to the purifier with the gases. By this arrangement the volatile hydrocarbons are always revolatilized by the current of heated gases, and these gases pass on saturated with them.

Under the second mode of carrying out this invention the condensers and scrubbers are arranged in two sets, and between them a tank is situated into which the tars from both sets of condensers and scrubbers flow. The tank is supplied with a steam jacket or its equivalent for heating the contained tars to a temperature sufficiently high to revolatilize the hydrocarbon vapours absorbed by them. The gases after passing through the first set of condensers and scrubbers are caused to pass over or through the heated tars contained in the tanks, and these gases thereby become saturated with the hydrocarbon vapours, after which they are passed into the second set of condensers and scrubbers wherein the surplus, or that portion of the hydrocarbon vapour which they cannot retain, is removed, and the gases are then passed to the purifiers. Under this arrangement it is preferred that no water be used in the second set of scrubbers.

Under the third mode of carrying out this invention, a combined system of condensers and filters or scrubbers is employed, and this consists of alternate cooling chambers and screens or filters. The cooling chambers may be of any convenient form, and the screen or filters may consist of a number of small short pipes, or of sheets of fine woven wire gauze, or perforated divisions filled with small pieces of coke, charcoal, stones, or other material, and placed between each alternate cooling chamber, the whole arrangement being such that the condensed tars may flow in an opposite direction to the gases, and that the gases come as little as possible in contact with the tars at low temperatures. The gases are first passed through a cooling chamber, and reduced in temperature to about 200° Fahr. The mechanically suspended tars are then filtered out by passing the gases through the first filter into the second chamber, where they are further reduced in temperature to about 150° Fahr., and are again passed through a second filter to remove suspended tars. This process is repeated, alternately cooling and filtering until the gases acquire the same or nearly the same temperature as the air, and by this means the heavy tars are removed before the temperature is sufficiently reduced to allow the volatile vapours suspended or diffused through the gases to be absorbed by the tars.

Under a fourth mode of carrying out the invention, a very large chamber is employed, into which the gases leaving the retorts escape, and are slowly cooled to a temperature preferably not less than 90° Fahr. This chamber is kept warm either by being placed in a warm house, or by having a steam-pipe passed through it, or by other equivalent means, the object being to allow the tars that are mechanically suspended to settle out at a temperature at which they do not absorb the volatile vapour and other hydrocarbons from the gas. Instead of the chamber a large pipe or series of pipes, heated to the required temperature, may be used. The gases are passed from this chamber, or from the pipe or pipes, to be further condensed and then conveyed to purifiers.

All these means may be used combined, or partly or singly, to accomplish the object of preventing the hydrocarbons from coming in contact with the tars, or if coming in contact with the tars, they do so at a temperature which will not admit of the tars absorbing those hydrocarbon vapours which give illuminating power to the gases. To enable the gases to absorb and permanently retain the suspended hydrocarbon vapours, the aqueous vapours are removed by causing them to pass through or over dry caustic lime, or other absorbent placed in a chamber on trays, or otherwise arranged so as to expose a large surface to act on the gases. This drying arrangement may be applied before, but by preference immediately after, the gases leave the purifiers, and to prevent the gases during their subsequent storeage and distribution from reabsorbing watery vapours, the surface of the water in the tank containing the gasholder is covered with a layer of what is known in commerce as "intermediate paraffin," oil saturated with paraffin spirit, or other light spirit.

The same compound oil and spirit are also used under this invention in wet meters, and a special advantage in the use of the same over and above the prevention of the absorption of the watery vapour is that the said mixed oil and spirit do not evaporate nor yet absorb anything from the gas, one filling of the meter being all that is required, a constant liquid line or level being attained in the meter, thereby giving correct measurement, so that the gas surveyor does not require to replenish the meter with water as at present.

2605.—WISE, W. L., Adelphi, London, "*Improvements in stop-valves.*" A communication. Patent dated July 25, 1874.

This invention consists of a valve so constructed that the combined impact and pressure of the incoming fluid is in opposition to the closing of the valve, the course of such fluid being instantly reversed on passing the valve, thereby preventing any shock when the valve closes.

2618.—GAUKROGER, J., Todmorden, FIELDEN, S., Walsden, and AITCHISON, A., Manchester, "*Improved apparatus for generating gas for lighting, heating, and cooking.*" Patent dated July 27, 1874.

This apparatus consists of a stove, of a square, round, or other convenient form, and of a suitable size, made of cast or wrought iron, or other material. Inside this stove, in a horizontal position, are placed three or more retorts made of copper, wrought or cast iron, fire-clay, or other material, attached to the outside casing of the stove, and furnished with doors for convenience of access for charging, discharging, or cleaning.

The top of the stove forms a hot-plate, having several holes or openings for the reception of cooking utensils, and in the front of the stove there is also an opening for roasting or other similar purpose. At one end of the stove is a wheel or fan, inclosed in a box or chamber, through which the gas passes, and in doing so turns the wheel or fan which is connected to and turns a spit in front of the roasting aperture.

Beneath the retorts are placed perforated tubes for supplying the gas for heating the retorts. There are tubes leading from the retorts to a gasometer, and other tubes leading again from the gasometer to the perforated tubes under the retorts; so that when once the retorts are heated, and the gas flows into the gasometer, the latter supplies gas to the perforated tubes which heat the retorts, and the apparatus is then self-generating and self-acting, no more fuel being required.

2631.—BUDENBERG, A., Manchester, "*Improvements in illuminated pressure and vacuum gauges.*" A communication. Patent dated July 28, 1874.

According to this invention an illuminated steam or other gauge is constructed with a transparent back as well as a transparent dial, and the illuminating medium is placed in a suitable compartment at the back of and outside the gauge, by these means the dial is protected from being coated with soot, and the heat is prevented from entering the dial-case, and affecting the delicate mechanism of the gauge.

2632.—BOWNESS, W. D., and JUDGE, J., Bishop Auckland, "*Improvements in apparatus for generating and purifying gas for illuminating and other purposes.*" Provisional protection only obtained. Dated July 28, 1874.

This invention consists in improvements in the construction of retorts for generating gas from coal or other suitable substance, and in the apparatus for purifying the gas after it leaves the retort.

The retort or generator consists of a vertical cylinder of the ordinary construction; but upon its outside a plate of metal is placed spirally, so as to form a flue running round it. Instead of heating the retort at the bottom, the fire is placed at or near the end, and the heat and waste gases pass through the flue and around the retort to the chimney, by this means retaining a uniform degree of heat throughout the retort. A greater amount of heat is thus obtained with a smaller consumption of fuel than by the method hitherto adopted.

The purifier consists of a metallic tank, partially or entirely filled with water, in which is placed a perforated tubular ring connected with the retort by means of a pipe. Through the ring the gas passes into the water, and thence to a metallic cylinder placed above the tank, the interior of which contains a number of perforated metallic plates. Lime is placed between the plates, and above these is another plate not perforated, but provided with an aperture in which a sponge is fitted. The gas passes from the tank through the perforated plates and the intermediate lime, through the sponge, and so is perfectly purified and ready for consumption.

The gas from the purifier may be conducted directly to the pipes for consumption, or to a gasholder in the ordinary manner.

2660.—CLARKE, J. F., Morgate Street, London, "*Improved apparatus for distributing water in public thoroughfares.*" Patent dated July 30, 1874.

This invention consists of an arrangement of portable stand-pipe to be applied to cocks or valves below the street level in connexion with the water-mains, and provided with a discharge-pipe and nozzle or spreader. The stand-pipe, which terminates in a cross handle at top, also serves as a key for turning the cock to which it is applied.

2666.—MUSHET, R. F., Cheltenham, "*Improvements in the method of raising water and other fluids, and in the construction and arrangement of apparatus for that purpose.*" Patent dated July 31, 1874.

This invention consists of certain improvements whereby water and other fluids can be raised from a greater depth than has hitherto been practicable, by the use of an ordinary suction-pump.

To the lower end of the barrel of an ordinary suction-pump is attached a suction or feed-pipe, the united lengths of which must not together exceed the height to which in practice a suction-pump will raise a column of water. The lower end of the suction-pipe passes into a covered reservoir or chamber, and extends nearly to the bottom of it. A second length of suction or feed-pipe is inserted through the bottom of the reservoir or chamber, and passes upwards to within a short distance of the top. A similar arrangement of pipes and reservoirs or chambers is continued until the source of water is reached. The reservoirs or chambers are respectively supplied with water by any convenient means, a stratum of air remaining at the top of each reservoir or chamber. The pump is set in action in the ordinary manner, and the water is raised from the source of supply and discharged from the outlet of the pump-barrel. A check valve or valves is or are placed in the suction-pipes for the purpose of sustaining the column or columns of water, and thereby rendering the discharge from the pump more uniform than it otherwise would be.

2675.—BROWNE, S. G., Kilburn, and MOORE, A., Euston Road, London, "*Improvements in pipe-wrenches.*" Provisional protection only obtained. Dated Aug. 1, 1874.

According to this invention a pipe-wrench having two diverging jaws has on one of its jaws a moveable roller which intervenes between the jaw and the side of the pipe to be grasped, while the pipe bears against the other jaw. By this arrangement when the wrench is turned in one direction the roller is made to roll upon its jaw, and thus nip the pipe between it and the other jaw. The roller is held in place against its jaw by side cheeks on the jaw, or by arms turning on pivots on the jaw, or by any other device which will allow the roller to move along the jaw. A spring is provided for bringing the roller in contact with the pipe. The surfaces of the jaws and the roller may be serrated, and the jaw against which the pipe bears may be formed with a series of hollows corresponding to pipes of different diameters.

According to another arrangement the one jaw of the wrench is formed with a concave curvature eccentric to a pivot on the other jaw on which a roller is mounted.

APPLICATIONS FOR LETTERS PATENT.

1194.—Barlon, V., Paris, "Improvements in apparatus for regulating the flow of lighting gas as well as for regulating the delivery of liquid and fluid substances of all kinds." April 2, 1875.

1195.—Whitwham, F. G., Cannon Street, London, "Improvements in the treatment of human excreta, and in the manufacture of manure therefrom, and in the apparatus employed therein." A communication. April 2, 1875.

1197.—Stuttle, W., Shrewsbury, "Improvements in gas-brackets." April 2, 1875.

1209.—Breeden, J., Birmingham, "Improvements in sliding chandeliers and gaseliers." April 3, 1875.

1210.—Southby, A. G., Abingdon Street, Westminster, "Improvements in stoves for boiling and heating by gas." April 3, 1875.

1211.—Southby, A. G., Abingdon Street, Westminster, "Improvements in the mode and apparatus for supplying gas-stoves with gas." April 3, 1875.

1216.—Newton, W. E., Chancery Lane, London, "An improved method of and apparatus for treating fœcal matters, so as to destroy their noxious qualities, and to obtain useful products therefrom." A communication. April 3, 1875.

1225.—Carr, W., Upper Holloway, London, "Improvements in lamps." April 5, 1875.

1233.—Hellier, H. G., Brixton, London, "Improvements applicable to or connected with lamps and other light suppliers and burners, and apparatus through which gas is supplied to burners." April 5, 1875.

1262.—Snell, H. S., Southampton Buildings, London, "Improvements in the fittings of house sinks and water-closets and urinals." April 7, 1875.

1270.—Robertson, J., Glasgow, "Improvements in water-meters." April 8, 1875.

GRANTS OF PROVISIONAL PROTECTION.

1058.—Walker, W. T., Highgate, London, "Improvements in centre-valves." March 23, 1875.

1077.—Challender, J., Manchester, "Improvements in apparatus for illuminating public clocks, which improvements are also applicable to other illuminating purposes." March 24, 1875.

1084.—Kusenberg, A., Düsseldorf, Germany, "Automatic condensed water conduit or steam-trap." March 24, 1875.

1116.—Nicholas, J., Hope, Flint, "An improved method of and apparatus for carbonizing coal, slack, peat, wood, bones, and other like materials, subjected to a coking process or to destructive distillation, whereby commercial products are obtained and the vapours and gases utilized." March 27, 1875.

1120.—Brown, M. H., New Cross, London, "Certain improvements in water-closets for deodorizing and disinfecting the same, applicable also for other places." March 27, 1875.

1137.—Heap, J., Oldham, "Improvements in apparatus and appliances for screwing and tapping bolts, nuts, tubes, and other articles." March 30, 1875.

1164.—Lyall, J., Glasgow, "A new or improved tube expander." March 31, 1875.

NOTICES TO PROCEED.

4189.—Willans, P. W., Blackheath, London, "Improvements in hydraulic engines and pumps." Dec. 5, 1874.

737.—Keirby, J. E., Swinton, Lancaster, "Improvements in elastic and other packings for pistons and piston-rods of steam-engines, pumps, rams, and other similar purposes." March 1, 1875.

744.—Dickson, J. F., Leicester, "Improvements in air and gas engines or motors." March 1, 1875.

862.—Mann, W., Blackfriars Road, and Owens, S., Whitefriars Street, London, "Improvements in valves." March 9, 1875.

902.—Carey, R., Southwark, and Porter, R., Fenchurch Street, London, "Improvements in valves for regulating the flow or discharge of gas, water, and other fluids." March 11, 1875.

930.—Findlay, J., Glasgow, and Jack, W., West Calder, "Improvements in the destructive distillation of coal, shale, and other bituminous substances, and in the apparatus or retorts employed therefor." March 12, 1875.

999.—Brotherhood, P., Notting Hill, London, "Improvements in apparatus for forcing or compressing fluids or liquids." March 18, 1875.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3459.—Hallsworth, S., and Bailes, R., Leeds, "Improvements in the mode of treating and clarifying sewage or other impure waters." Oct. 9, 1874.

3567.—Ashworth, G., and Ashworth, E., Manchester, "Improvements in steam-pumps or pumping engines." Oct. 17, 1874.

3577.—Coleman, J. J., Glasgow, "Improvements in the production of volatile liquid hydrocarbons from hydrocarbon gases, and in the apparatus employed therefor." Oct. 17, 1874.

3658.—Parker, T., Birmingham, and Weston, P. A., Salop, "Improvements in direct-acting pumps worked by steam, compressed air, or water, which improvements may also be applied to motive-power engines worked by steam, compressed air, or water." Oct. 23, 1874.

4271.—Murdoch, H. H., Staple Inn, London, "Improvements in screw-taps." A communication. Dec. 11, 1874.

430.—Porter, G., Cullum Street, London, "Improvements in gas-burners." Feb. 4, 1875.

531.—Kidd, J., Dartmouth Street, Westminster, "Improvements in the manufacture or production of gas for heating or other purposes, and in the materials and apparatus or means employed therein." Feb. 13, 1875.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

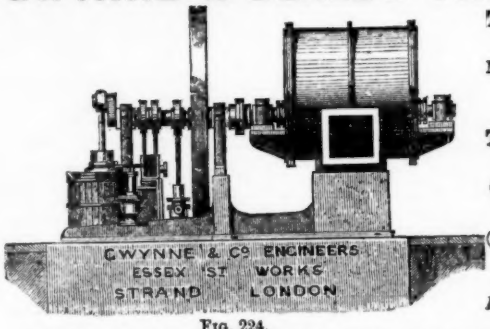

Fig. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of GAS-EXHAUSTING MACHINERY.

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Prices and every information on application.

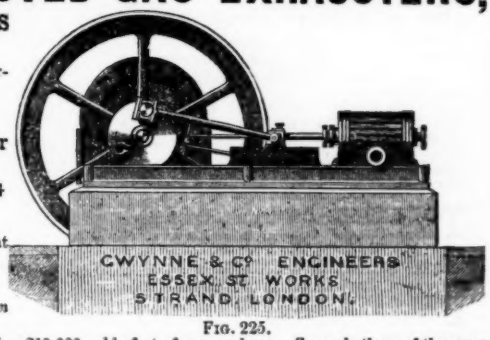

Fig. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. Gwynne and Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,
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G. & Co. are now manufacturing for a London Gas Company three of their 210,000 *cubic feet Patent Gas Exhausters, and many of all sizes.*

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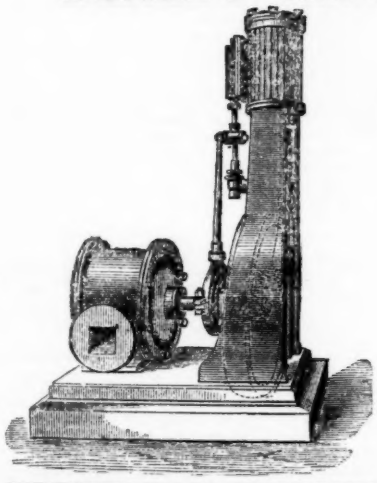
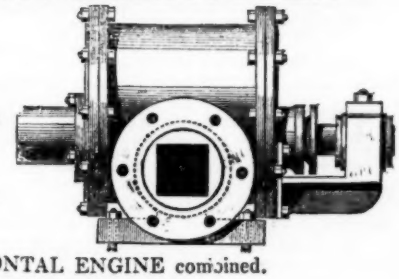


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



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TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
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WANTED, to Lease a good Gas-Work, making at least 20 million feet annually. A fair rate of interest on the capital will be paid as rent.

Address H., care of Messrs. SPENCE AND IRWIN, 67, Grey Street, NEWCASTLE-ON-TYNE.

WANTED, an engagement as Manager, or Manager and Collector, of Gas-Works, where the make is about 20 million. Thoroughly efficient. Highest testimonials and references from present and previous employers.

Address, in first instance, to No. 140, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO FOREMAN STOKERS.

WANTED, by a large provincial Gas Company, Two Foreman STOKERS. Wages about £2 per week. Only those who have held a similar situation need apply. Applicants must state age and previous experience.

Address, with testimonials and references, to No. 150, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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WANTED, a practical Engineer and Manager for the Halifax Corporation Gas-Works. The person appointed will be required to devote his whole time to the works. Salary £250 per annum.

Applications, accompanied by testimonials, must be sent to me on or before the 28th inst.

By order,
A. C. FOSTER, Town-Clerk.

Town-Hall, Halifax, April 8, 1875.

ADVERTISER, aged 29, married, seeks an ENGAGEMENT in any position of trust. Has had eight years experience (gas and fitting) in the offices of a Gas Company. First-class references.

Address X., 4, Hundleby Place, Edwardes Street, Mosely Road, BIRMINGHAM.

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SITUATION Wanted, as Superintendent, Foreman, or otherwise, by a thoroughly practical Man of good general experience. Thoroughly acquainted with every detail connected with compressed gas, and every description of gas regulator; also heating, lighting, and ventilation. No objection to travel.

Apply, by letter, to MAURICE, Post-Office, High Street, CAMDEN TOWN.

THE ANALYSIS OF COAL GAS.—Mr. A. L. Sparkes, B.A., F.C.S. (Gas Examiner at Hanley, Stoke-Fenton, and Newcastle), gives Private Lessons in Photometry and Gas Testing.

Terms on application at Snow Hill Cottage, Shelton, STOKE-ON-TRENT.

NEW EDITION, NOW READY,

ADVANTAGES OF GAS FOR

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By MAGNUS OHREN, A.I.C.E., F.C.S.

For Companies to issue to their Gas Consumers.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

TO BE SOLD—A Purifier, Condenser, and Station-Meter. Adapted to small works.

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FOR SALE—A 30,000 per hour Station- METER, by Sugg, of Westminster, in good condition and working order.

Apply to FRANK MORRIS, Engineer to the Company, BRENTFORD.

WOLSTON'S TORBAY IRON PAINTS.

THE Torbay and Dart Paint Company, Limited, 23, Great George Street, Westminster, S.W., having been informed that PAINTS not manufactured by them are being offered to Gas Companies and the public as "WOLSTON'S," hereby give notice that they will TAKE PROCEEDINGS against any persons infringing their rights as sole proprietors and manufacturers of Wolston's Torbay Iron Paints.

(See Advertisement on another page.)

TO TAR DISTILLERS AND OTHERS.

THE Directors of The Gaslight and Coke Company are prepared to receive TENDERS, on or before Thursday, the 15th inst., for the purchase of the TAR manufactured at their several stations, in accordance with particulars to be obtained at this office.

By order,
JOHN ORWELL PHILLIPS, Secretary.

Chief Office, Horseferry Road, Westminster, S.W.,
April 9, 1875.

TO TAR DISTILLERS, &c.

THE Directors of the Northampton Gas- light Company are prepared to receive TENDERS for the TAR and AMMONIACAL LIQUOR produced at their works for One year from the 30th of June next.

The Tar, &c., can be loaded direct into boats or railway tank waggons at the works.

Tenders, at per 100 gallons for the Tar, and also for the Ammoniacal Liquor, to be delivered at the Company's Office, Northampton, on or before Tuesday, April 20.

The Directors do not pledge themselves to accept the highest or any tender.

JOHN EUNSON, jun., Engineer.

Northampton, March 22, 1875.

THE Directors of the Surrey Consumers Gas Company are prepared to receive TENDERS for the surplus TAR produced at their works, for a term not exceeding Three years, from the 8th of May next.

The Tar will be delivered free into barges at the Company's wharf, and is to be paid for monthly.

Any information can be obtained on application to the Engineer, at the Company's Offices, Rotherhithe Street, where the tenders are to be sent in, on or before Saturday, the 17th of April.

The Directors do not bind themselves to accept the highest or any tender.

W. P. BONDY, Secretary.

Rotherhithe, April 7.

TO CONTRACTORS.

TENDERS are invited for the enlarge- ment of the Malpas Gas-Works, by the erection of a new Bench of Eight RETORTS, with hydraulic and connexions, two new Purifiers and Valves, one new Gas-holder and Tank, and other alterations, according to the plans and specifications, which may be seen at the Company's Office.

Tenders to be sent to the SECRETARY of the Malpas Gas Company, Limited, Malpas, CHESHIRE, not later than the 19th of April, 1875.

BOROUGH OF DARLINGTON.

TO ENGINEERS.

THE Darlington Corporation invite TENDERS for the supply, fixing, and completing all connexions and pipes for a new Bench of 120 RETORTS, with wrought-iron Hydraulic Mains, Condensers, Washers, Purifiers, &c., at their Gas-Works.

Drawings and specifications may be seen on application to the Manager, at the Gas-Works.

Sealed tenders, endorsed "Tender for Gas Apparatus," to be sent to me not later than Monday, the 19th day of April inst.

By order,
HUGH DUNN, Town-Clerk.

Darlington, April 1, 1875.

THE Belper Gas and Coke Company are prepared to receive TENDERS for the supply and fixing of the following APPARATUS:—

A new Bench of 29 Retorts, with wrought-iron Hydraulic Main, Ascension-Pipes, &c. Condensers, Scrubber, Engine and Exhauster, and Boiler. Also for the erection of an Engine-House.

Drawings and specifications may be seen at the Gas Office, New Road, Belper, on application to the undersigned.

Tenders to be sent in to me on or before April 27.

The Directors do not bind themselves to accept the lowest or any tender.

By order,
S. SOWOOD, Manager.

PONTYPOOL GAS AND WATER COMPANY.

TO CONTRACTORS.

THE Directors hereby invite Tenders from competent persons for the construction of Three FILTER-BEDS, according to drawings and specification, which may be seen at the Office of the Company, in Pontypool.

Copies of specification, with form of tender, may be had from the Secretary of the Company, on payment of 5s. for each copy.

The Secretary of the Company will arrange to show tenderers the sites of the proposed works.

Tenders, sealed and endorsed "Tender for Filter Beds," to be delivered at the Office of the Company, on or before the 6th day of May, 1875.

The lowest or any other tender will not necessarily be accepted.

By order,
ANDREW HAIR, Secretary to the Company.

Pontypool, April 8, 1875.

STAINES AND EGHAM DISTRICT GAS AND COKE COMPANY, LIMITED.

THE Directors of this Company invite TENDERS for the supply of 2400 tons of GAS COALS, of the following descriptions—viz., New Pelton, Pelaw Main, or Wearmouth, to be delivered at the Company's works, on the southern bank of the Thames, in the parish of Egham, and outside the City coal dues boundary.

The Coals to be delivered as follows:—400 tons in each of the months of October, November, December, and January next; 300 tons in each of the following months of February and March, and the remainder as ordered before the 1st of September, 1876.

The tender to state the price per ton for cash for the month's delivery and for credit at three months.

The Directors will not accept any conditional tender, or be bound to accept the lowest or any tender.

The tenders to be forwarded to me on or before the 1st of May next, sealed, and marked "Tender for Coals."

JOHN ANTHONY ENGALL, Secretary.

Staines, April 6, 1875.

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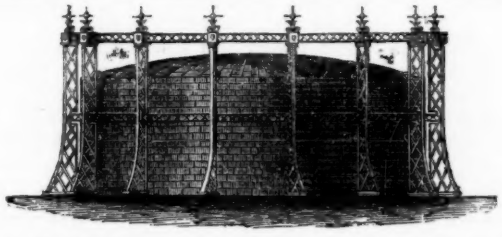

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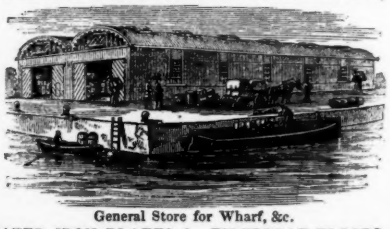
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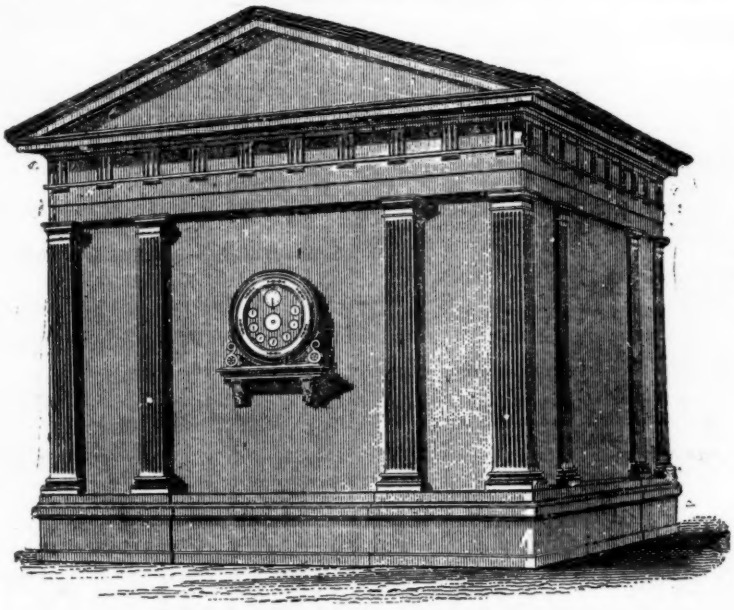

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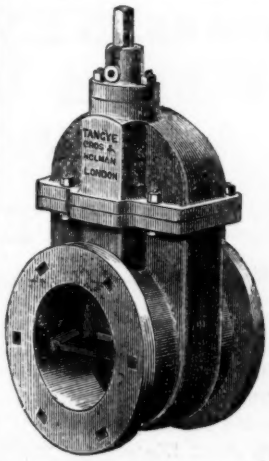

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Inch.	s.	d.
2½ .	24	0
3 .	27	0
4 .	36	0
5 .	45	0
6 .	54	0
7 .	63	0
8 .	80	0
9 .	90	0
10 .	100	0
12 .	135	0
14 .	180	0

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MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

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Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing 11 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

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One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

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Supply and Contract for all the principal Scotch Gas Coal (including Boghead), f.o.b., or delivered at home or abroad, and are **Agents** for the following:—

CHAPELSIDE No. 1 CANNEL,

Which yields 13,265 cubic feet of 35·86 standard candle gas; and 972 pounds of good coke, containing 18·89 per cent. of ash.

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Which yields 10,538 cubic feet of 33·2 standard candle gas; and 1216 pounds of coke, containing 11·86 per cent. of ash.

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Which yields 10,575 cubic feet of 27·38 standard candle gas; and 1240 pounds of coke, containing 11·56 per cent. of ash; and

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Which yields 10,018 cubic feet of 21·97 standard candle gas, and 1260 pounds of very best splint coke. (This is also a first-class steam coal.)

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Beg leave to call the attention of Gas Companies to the superior quality of their

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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

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NEAR SHEFFIELD,

STRONGLY RECOMMEND A TRIAL OF THEIR

CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6 0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

SILKSTONE AND MIDLAND
GAS COAL & CANNEL.

EMOR G. WRIGLEY

Has on hand a quantity ready for immediate delivery. Can strongly recommend both qualities.

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SILKSTONE COAL COMPANY,
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GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	**10,775**
Weight of coke in lbs. per ton of coal	**1,465**

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

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THE LOCHORE AND CAPLEDRAE CANNEL COAL
COMPANY, LIMITED.

Works: LOCHORE by LOCHGELLY, FIFESHIRE. Office: 19, MAITLAND STREET, EDINBURGH.

This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.		Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure	13,095 cubic feet.	..	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	..	34·83
Value of 1 cubic foot of gas in grains of sperm	780	..	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	..	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	..	71 minutes.
Gravity of the gas (air = 1000)	596	..	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.		Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	..	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	..	33·09
Value of 1 cubic foot of gas in grains of sperm	878	..	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	..	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	..	67 minutes.
Gravity of the gas (air = 1000)	677	..	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company, at

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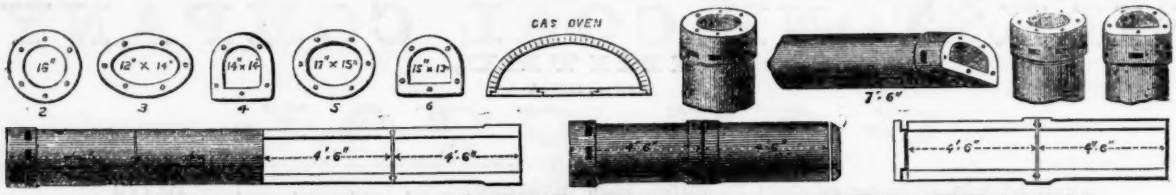

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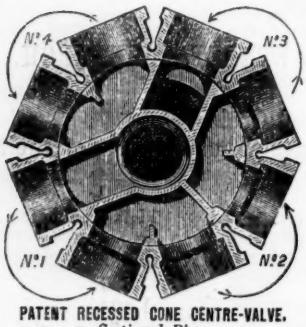

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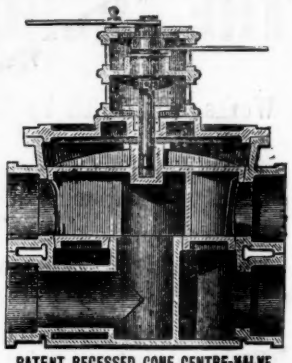

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